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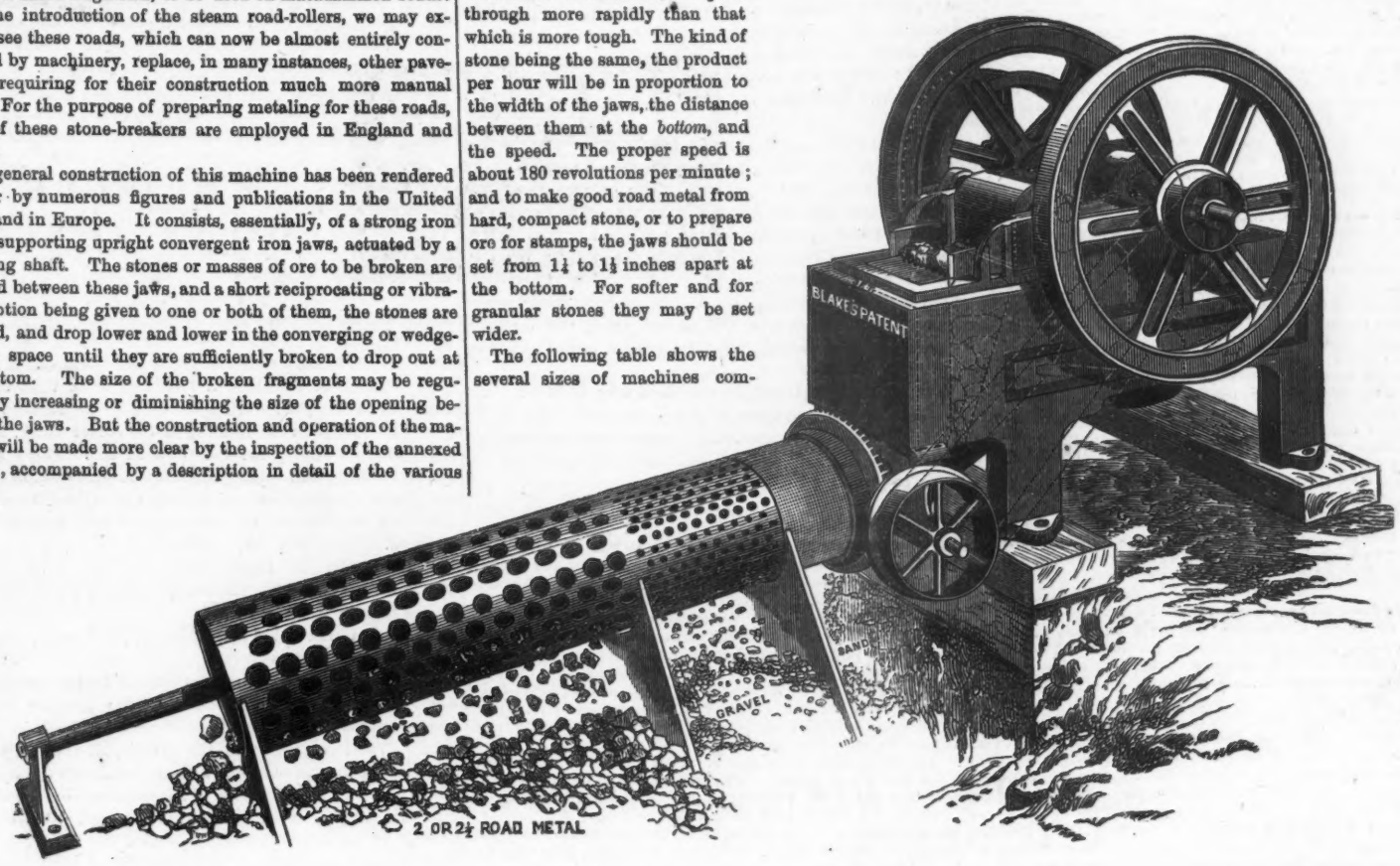
Stone and Ore Breaking by Machinery.

STONE-BREAKERS of various patterns have for years been economically employed to replace hand-labor. Foremost among them all stands the one we herewith illustrate, which was invented by Mr. ELI WHITNEY BLAKE, of New Haven, Connecticut. For years the machine has been successfully employed, both in this country and in England, for breaking rocks into small fragments, to be used on macadamized roads. With the introduction of the steam road-rollers, we may expect to see these roads, which can now be almost entirely constructed by machinery, replace, in many instances, other pavements, requiring for their construction much more manual labor. For the purpose of preparing metaling for these roads, many of these stone-breakers are employed in England and France.

The general construction of this machine has been rendered familiar by numerous figures and publications in the United States and in Europe. It consists, essentially, of a strong iron frame, supporting upright convergent iron jaws, actuated by a revolving shaft. The stones or masses of ore to be broken are dropped between these jaws, and a short reciprocating or vibratory motion being given to one or both of them, the stones are crushed, and drop lower and lower in the converging or wedge-shaped space until they are sufficiently broken to drop out at the bottom. The size of the broken fragments may be regulated by increasing or diminishing the size of the opening between the jaws. But the construction and operation of the machine will be made more clear by the inspection of the annexed figures, accompanied by a description in detail of the various parts.



BLAKES'S ORE AND STONE-BREAKER.

The machine represented in our engraving is constructed without the long lever which is ordinarily applied to the crushers of this pattern in this country. In England and France, however, this style of crusher is the one commonly employed, and it is, in fact, simpler in its construction than the one in common use in this country.

In the engravings which we herewith present, it will be seen that the shaft, D, FIG. 2, which carries the eccentric, E—which actuates the machine—is nearly in the middle of the frame, and that the eccentric is directly connected with the toggles, C, G, by means of the connecting-rod, or pitman, F. By the rotation of the shaft it is evident that the jaw, J, will be forced toward the fixed jaw, A, which is faced with the plate, H, against which the stones are crushed. By means of the screw, M, the wedge, N, may be raised or lowered. This moves the block, O, against which the toggles are braced, forward or backward, and regulates the distance between the jaws at the bottom, and hence the size of the pieces crushed. In case this variation is not sufficient, one or both of the toggles, C or G, may be removed, and either longer or shorter ones substituted. As will be seen from the perspective view, the crusher is provided with heavy fly-wheels, to prevent an undue strain upon the driving machinery, and also with a cylindrical sieve of sheet-iron, rotated by geared wheels, which receives the fragments as they come from the crusher. The screen has been found serviceable for separating the dirt from stones which are to be used for making concrete, and has also been applied, when it was desired, to prepare metaling for very fine work, as, for example, the paths in parks, etc. In general, for preparing railroad ballast, or breaking stones for macadamized roads, or preparing ore for the stamp-mills, this addition is entirely unnecessary, and, in fact, is only furnished when explicitly ordered.

This machine is largely used in our Western States and Territories, for preparing the ore for the stamp-mills. It was introduced into California in 1861, and has been eminently successful.

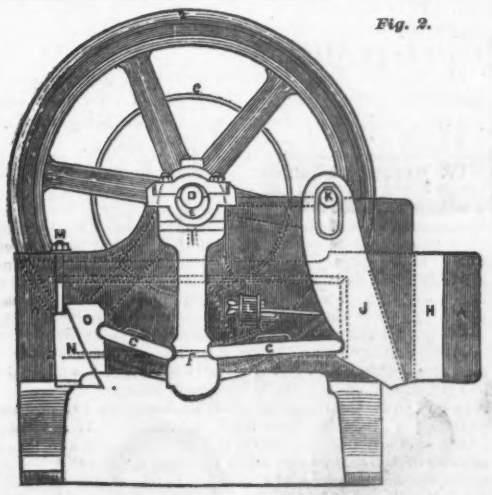
Machines are made of various sizes. Each size will break any stone one end of which can be entered into the opening between the jaws at the top. The size of the machine is designated by the size of this opening; thus, if the width of the jaws be 15 inches, and the distance between them at the top 9 inches, the size is called 15 by 9.

The product of these machines per hour, in cubic yards of fragments, will vary considerably with the character of the stones broken. Stone that is brittle, like quartz, granite, and most kinds of sandstone, will pass through more rapidly than that which is more tough. The kind of stone being the same, the product per hour will be in proportion to the width of the jaws, the distance between them at the *bottom*, and the speed. The proper speed is about 180 revolutions per minute; and to make good road metal from hard, compact stone, or to prepare ore for stamps, the jaws should be set from 1¼ to 1½ inches apart at the bottom. For softer and for granular stones they may be set wider.

The following table shows the several sizes of machines commonly made; the product per hour of broken stuff from the hardest materials, when run with a speed of 180; the power required to perform this duty; the whole weight of each size in round numbers, and the weight of the heaviest piece when separated for transportation:

Size.	Product per hour.	Power required.	Total weight.	Weight of frame and parts attached.
10 by 5	4 cubic yards.	6 horse.	6,600 pounds.	3,200 pounds.
10 by 7	4 cubic yards.	6 horse.	7,600 pounds.	4,100 pounds.
15 by 5	6 cubic yards.	9 horse.	9,100 pounds.	4,700 pounds.
15 by 7	6 cubic yards.	9 horse.	10,200 pounds.	5,600 pounds.
15 by 9	6 cubic yards.	9 horse.	11 600 pounds.	6,800 pounds.

Fig. 2.



The machine may be driven by any power less than that given in the above table, yielding a product per hour smaller in the same proportion.

Either of the sizes mentioned will break quartz enough in a few hours to feed a forty-stamp mill for one day. A machine of less capacity would, of course, have a smaller mouth, and would not take large stones. It is usual, therefore, for millmen to use the largest-mouth machine, and to run it a few hours each day. The rough blocks, as they come from the mines or quarry, being ready on the platform near the mouth of the breaker, two men can feed it into the machine and break it up at the rate of five to ten tons per hour, according to the size of the machine. Breakers have been made larger than any of the above, for breaking very large blocks of ore. They are in use at Lake Superior copper mines, where they take in masses of ore 18 by 24 inches, and crush them without difficulty. The fragments from these large breakers are received by machines of ordinary size, and are broken again, as small as required. The metallic copper is readily picked out by hand from this broken ore. These large machines would be useful at many mines in California and Nevada, and would permit sledging to be dispensed with. The machine is made without the lever, and works very slowly, but without loss of power, since, when it is not crushing, the only power consumed is that required to overcome the friction, whereas, with the heavy stamps, still largely in use, the greatest expenditure of power is when the least work is performed.

The jaws of the breaker are the only parts subject to rapid wear, and it is usual to provide the movable jaw with movable face of hard white iron. These are made about four inches thick, and in such a manner that they can be turned over or end for end, until they are too much worn to be longer used. They are secured to the jaw by means of conical bolts, and bedded in zinc or refuse type metal, in order to have an equal and solid bearing. The forward or fixed jaw can also be reversed in its bed, and is held back to its place by wedge-shaped cheeks on each side. It is usual to make both jaws with vertical, coarse corrugations or furrows, so that the ridges of one jaw are opposed to the depressions on the other, thus giving a zigzag form to the aperture at the bottom. This tends to prevent long and thin pieces from slipping through without being broken; but it is not otherwise essential to the satisfactory operation of the machine, and plain jaws are frequently used.

The Angle of a Vessel's Stability.

THE hydraulic gunboat "Water Witch" has been inclined with ballast, in the basin at Keyham, to obtain the requisite data for calculating her angles of stability. Thirty tons of iron ballast were placed first on one side of the deck and then on the other, the extreme heel of the vessel being six degrees.

Polytechnic Club of the American Institute.

Meeting held at the rooms of the Association May 18, 1871. The President (Prof. S. D. TILLMAN) in the chair.

THE PRESIDENT (Prof. S. D. TILLMAN), presented his summary of scientific news as follows:

I. THE THEORY OF ATMOSPHERIC GERMS.—Dr. A. E. SANSOM has given, under this title, in *The Quarterly Journal of Science*, a brief statement of the positions assumed by the opposing parties in the learned societies of France, who have long mooted the question as to the cause of putrefaction and fermentation, and who appear to have arrived at that stage at which each prefers to remain unconvinced. In both processes there is observed the occurrence, growth, and multiplication of living organisms, either amid the particles of the moist decomposing substance, or upon the surface, where these frequently make their appearance as ordinary mildew. How are these results explained by the two theories? According to the one, the molecules of a putrifying or fermenting body are in a state of motion, tending to the disruption of their elements. The living particles observed are the results of the communion of certain non-living elements with the physical forces with which they are in relation. Thus there is a strict analogy between crystallization and creation. As in the one case certain molecules, under certain conditions, assume definite crystalline forms, so certain molecules under other conditions assume the appearances and attributes of vitality. According to the other theory, there is a single cause for all the phenomena. This cause is the presence of living matter. The organic elements of a putrescible or fermentable compound undergo disruption by no inherent tendency of their particles to motion, but by the influence upon them of living, growing, and multiplying organisms which, by their very acts of life and struggle for existence, superinduce this disruption. The living beings which are acknowledged to be present are the intimate causes, and not the adventitious signs, nor yet merely intermediate agents, of the decomposition of the material. Dr. SANSOM investigates the question from the stand-point of the second theory. After presenting the principal positions which have been established by experiment and observation, he takes up the only real objection to the reception of the germ theory—the resistance to the destructive agency of heat—and then alludes to the effects of other physical agencies which may contribute to a solution of the question. It is not by the results of a single method of investigation that this question is to be judged, but rather by the collective evidence of many methods.

Heat is not the only destructive agency which may be employed in the inquiry; others, fraught with much valuable teaching, may be put in force, though these have been apparently in the recent controversies entirely ignored. Such are the evidences derived from the destructive influences of chemical and of poisonous agents. It has been known from time immemorial that the addition of certain compounds prevents both putrefaction and fermentation. The belief being that these processes were essentially chemical, it was naturally probable that the agents which suppressed them should be susceptible of a chemical classification. If the processes were, as asserted, those of oxidation, it would surely be not unreasonable to expect that the agents which arrest them should also arrest oxidation; but common experience taught an absolutely contrary lesson—that oxidizing agents were the most efficient in arresting the processes. Again, on the chemical theory, there ought to be some quantitative relation between the amount of a chemical agent employed and the degree of its influence; but the fact is that an agent present in such feeble quantity as to be capable of no appreciable chemical effect on a mass of putrescible material, is yet capable of stopping all putrefaction. Furthermore, agents, such as carbolic acid, which are proved to exert no influence whatever on processes purely chemical, are among the most efficient of all means for preventing putrefaction and fermentation. A large series of observations show, on the other hand, that the agents arresting these processes exert their influence precisely in so far as they are *poisonous* agents to low organisms. If at any stage of the process these microscopic organisms are rendered lifeless, the process, with all its attendant phenomena, ceases; on the other hand, the overt signs grow with their growth, strengthen with their strength, subside when they languish, and cease when they die. Hitherto experiments have usually been made with the view of ascertaining the effects of antiseptic agents when mixed with putrescible material; but the author has attempted to ascertain the results which occur when air alone is influenced by certain agents, the materials being left intact. In this way the heat may be tested by the evidence of other agents of vital destruction. The results obtained may be thus briefly summarized:

I. Putrefaction, mildew formation, and the appearance of organisms can be checked or absolutely prevented by the existence of certain agents in the air supplied to a putrescible body.

II. The power of such agents can in no sense be measured by their chemical constitution or characters. From many experiments the following expresses their order of efficiency, from weakest to strongest: (1) Chloride of lime. (2) Sulphurous acid, ammonia, sulphuric ether. (3) Chloroform. (4) Camphor. (5) Iodine, phosphorus, creosote, carbolic acid.

III. The agents which stop fermentation are vegetable, not animal poisons. Fungi will grow in the presence of hydrocyanic (prussic) acid and of strychnia.

IV. Comparative experiments show that a given volatile agent is far more efficient when it is contained in the air supplied to a putrescible solution than when an equal quantity is mixed with the solution itself.

V. All fungoid organisms can be prevented by the presence of a minute proportion of creosote, carbolic acid, ammonia, hydrochloric acid, or sulphurous acid in the air, though beneath the surface of the fluid are found numerous bacteria and vibrios.

There seems to be no escape from the conclusion that the germs of fungi exist in the air and are destroyed by the volatile, poisonous agent.

MR. R. D'HEUREUSE said that the phenomenon of putrefaction was very generally confounded with that of fermentation. Some agents would prevent the one process and assist the other. Atmospheric air actively promotes fermentation, and at the same time destroys putrefaction or decay.

DR. P. T. VAN DER WEYDE: Scientists distinguish between different kinds of changes which may be grouped together under the general term fermentation. We have the alcoholic and the acetic fermentation, very different from each other, but requiring the same agents at different temperatures. Putrefaction is the last in this general series of fermentations. The alcoholic fermentation is the least destructive, but they are all destructions of organic elements. By the alcoholic fermentation the starch is first changed into grape sugar and then into alcohol. By the acetic fermentation the alcohol is changed into vinegar. Some agents which will prevent one kind of fermentation will promote another kind, because they require different conditions. The two theories spoken of in this paper appear to turn upon the question, which is the great question of the age, of spontaneous generation; for if we admit the existence of spontaneous generation we do not need these theories.

MR. D'HEUREUSE: I do not wish to be misunderstood. The alcoholic process is a perfectly healthy action; and what is called the acetic fermentation is really an oxidation; but putrefaction is a process of decay.

II. VALUABLE AUSTRALIAN TIMBER.—Two kinds of wood indigenous to Western Australia have recently attracted considerable attention, from the fact that they possess qualities not found in the common woods of our forests. The Jarrah-jarrah timber is very hard, and capable of receiving a high polish. It is never attacked by white ants, nor by the *teredo navalis*, which abound in tropical and semi-tropical seas. It is therefore of great value in hot climates for ship-building, pier and railway construction, as well as for the interior of buildings and for furniture. The immunity of this wood from the attacks of insects, whether land or marine, has been proved by analysis to be due to the presence of tannic acid. The other variety is the Tooart wood. It has a very close grain, and is so extremely hard that it cannot be split, and will endure great heat without rending. On account of its non-liability to split, it has been suggested for use in gun-carriages.

MR. FISHER: Might not other kinds of wood be made impervious to the ants by the use of tannic acid in some way?

THE PRESIDENT: Various attempts have been made to protect common woods from the ants, but they have not been completely successful; and the wood prepared by nature is cheaper than anything else. I do not myself believe that tannic acid has the power of protecting wood.

Prof. PHIN: The great difficulty is that the ants do not eat the wood; they merely burrow in it. They gnaw it and throw the dust out. Poisoning the wood, therefore, does not affect them.

MR. FISHER: This is a matter of much importance in the fine arts. Many of the finest pictures, painted upon panels, have been entirely destroyed by worms. The experience of 350 years shows that pictures upon canvas are not as durable as those upon panels, provided we can get good panels. They are frequently made of cracked and knotty wood. What is wanted is wood impervious to worms, impervious to rotting, and not liable to crack or split. And as the additional cost of half a dollar per square foot, half an inch thick, would not be an objection, chemists are not limited in their use of means in preparing the wood.

MR. ROBERT WEIR: Is not the millboard very durable?

MR. FISHER: Yes, but it bends and gets out of shape.

MR. WEIR: Boards are also made of paper—of papier-maché.

MR. FISHER: I think the best substance will probably be found to be prepared wood.

III. WATERPROOFS.—The "Lounger" of the *Illustrated Times* says: By the way, touching waterproofs, I think I can give travellers a valuable hint or two. For many years I have worn india-rubber waterproofs, but I will buy no more, for I have learned that good Scottish tweed can be made completely impervious to rain, and, moreover, I have learned how to make it so; and, for the benefit of my readers, I will here give the recipe: In a bucket of soft water put half a pound of sugar of lead and half a pound of powdered alum; stir this at intervals until it becomes clear; then pour it off into another bucket, and put the garment therein, and let it be in for twenty-four hours, and then hang it up to dry without wringing it. Two of my party—a lady and gentleman—have worn garments thus treated in the wildest storm of wind and rain without getting wet. The rain hangs upon the cloth in globules. In short, they are really waterproof. The gentleman, a fortnight ago, walked nine miles in a storm of rain and wind such as you rarely see in the south, and when he slipped off his over-coat, his under-clothes were as dry as when he put them on. This is, I think, a secret worth knowing; for cloth, if it can be made to keep out wet, is in every way better than what we know as waterproofs.

Prof. PHIN: I have seen a piece of common musquito netting with the meshes 1-16th of an inch wide laid over a tumbler, and a teaspoonful of water poured upon it, and the water stood in a large globule and did not fall through. The material had been rendered repellant by some preparation, so that the water will not pass through unless under pressure. But the air passes through freely.

THE PRESIDENT: The great objection to rubber waterproof is that it is air-proof also. I remember that when I was in college, I bought a pair of india-rubber boots to keep my feet dry, and, to my surprise, found that my feet were wet. I ascertained that it was because the perspiration could not get out. It is unhealthy to wear india-rubber clothes, because they retain the perspiration. But the prepared cloth allows the perspiration to pass off freely.

Dr. VAN DER WEYDE said that in wearing clothing which retained the perspiration, we really poison ourselves; because the perspiration is a substance which nature is trying to expel, and which it is an injury to retain in the system.

IV. WONDERFUL RAPIDITY OF PHOTOGRAPHIC ACTION.—The image of the full moon can be fixed in less than one-fourth of a second, and that of the sun instantaneously. According to the experiments of Mr. WATERHOUSE, a space of time no longer than one twenty-seven-thousandth of a second is required to fix the solar image. Even this small fraction, however, inconceivably short as it appears, is a tolerable length of time compared with that in which photographs are taken by the electric flash. The duration of the illuminating sparks, according to the beautiful and trustworthy experiments of Mr. WHEATSTONE with his delicate chronoscope, does not exceed the millionth part of a second, and yet a clear and distinct photographic image is obtained by a single electric discharge. By this means may be shown the real form of objects to which a deceptive appearance is given by their rapid movement. If a wheel on whose side any figure is drawn in conspicuous lines be made to rotate with the greatest possible velocity, the figure will present to the eye only a series of concentric bands of different shades. Let it now be photographed while in motion by the electric flash, and the wheel will appear stationary with the figure well defined. A vein of water issuing from a small orifice, which appears to the eye as smooth as a stem of crystal, if seen or photographed by the light of the electric discharge, is shown to be composed of drops variously disposed, and of various forms, some being elongated, others flattened, and others almost spherical.

MR. FISHER suggested that perhaps photography might aid in determining the speed of light.

V. THE GASOPHANER.—An invention that may develope into something of great value is that of an English chemist, designed to show the existence of malarious gases. A piece of fused boracic acid, the size of a walnut, is heated to redness in chlorine. The mass is then blown the same as common glass into a bulb, and the "gasophaner" is ready for use. When first made the bulb is perfectly clear, but in being brought into contact with carbonic acid gas it becomes clouded with a light blue film, giving an opal lustre. By gentle reheating the film passes away. So great is the delicacy of the gasophaner that the breath of a child or a healthy person breathed on the bulb, can be detected from that of a person exhaling more carbonic acid. When held over a solution of sulphur the bulb becomes pitted as with small pox.

THE PRESIDENT said: A new vein of emery has been discovered quite recently, specimens of which will be presented by Mr. STEWART, who owns the land on which it is located. Powdered emery is used in large quantities for scouring, smoothing and polishing hard substances. The mineral is chiefly brought from Naxos and points still further east. Its virtue consists in its hardness, and this arises from the large percentage of alumina (the sesquioxide of aluminum) found in it. Next to the diamond in hardness is sapphire, which is nearly pure alumina. Corundum contains about 90 per cent. of alumina and 10 per cent. of magnesium, lime and silex, the largest portion of this being magnesium. Emery contains, in place of magnesium, sequioxide of iron, the percentage of alumina varying from 50 to 80, and that of sesquioxide of iron from 20 to 50. The emery found at Chester, Massachusetts, has the largest proportion of iron. The specimens now shown are from Chester county, Pennsylvania, and seem to contain far less iron. All the minerals alluded to are classed under the general term corundum.

Mr. A. P. H. STEWART exhibited specimens of emery from this mine, developed and rendered valuable under the supervision and through the exertions of Capt. JOHN ELLIOT. They are finer than any before reached, and remarkably free from the oxide of iron. He also exhibited specimens of tourmaline, granite, soapstone, mica, and asbestus, from the same region. This emery has been found especially valuable in working upon hardened steel or chilled iron. It has not yet been analyzed.

VEDDER'S SELF-ADJUSTING CAR COUPLER.

Mr. PARTRIDGE exhibited a model of J. D. VEDDER'S self-adjusting car-coupler, and explained its construction. It requires no change in the framing of the car or truck, and can be applied to any of the cars now in use. There are two springs, seizing and holding the arrow-headed link, in coupling the cars, and separated by a lever in uncoupling them. This lever may be so shaped as to be operated from any convenient position. When the car is turned at right angles with the link, the springs no longer hold; so that the car is free, if overturned, to roll down the bank, leaving the remaining cars on the track.

Mr. C. B. BOYLE stated that he had applied twenty years ago for a patent for that exact thing.

Prof. VAN DER WEYDE stated that the Miller patent now in use on the Erie Railroad was similar to this, but that this was an improvement upon the Miller car-coupler.

Prof. WHITNEY considered the Miller plan the better of the two, there being in that but half the number of parts. The Miller coupling prevents the "telescoping" of the cars by avoiding the play of twelve to fourteen inches on each car allowed by the ordinary link. Whether the Vedder coupling will practically uncouple on the overturning of a car can only be ascertained by trial. It would seem to require so much lateral motion of the car before it could be brought at right-angles to the next car, that perhaps it would force it from the track before it could uncouple.

Mr. PARTRIDGE stated that the plan of preventing the play between the cars made it necessary in starting that all should be started simultaneously, which was a severe strain upon the engine. In this coupling, however, the drawing springs while preventing any "lost motion" relieved the engine from the strain of starting the whole train at once.

Mr. BOYLE said that his plan was objected to for the reason that it allowed the overturned car to separate; and it was thought that it should be held on the track by the remaining cars.

Mr. T. D. STETSON: There seems to be no doubt now, that practically it is desirable to disconnect a car which gets off the track. It is now believed to tend to the safety of the disabled car; and as to the others, there is no question but it adds to their safety. The Baltimore and Ohio Railroad for a long time have used a wooden coupling, strapped with iron, so that it should twist and break when the car got out of line. There is much force in the objection that before the car can be turned over, it must necessarily be moved a considerable distance laterally.

Mr. PARTRIDGE: I think that that motion would cause this coupling to disconnect by opening the side springs and clearing the link from the jaws.

Prof. PHIN read a paper on the use of electricity as a motive power, which will be published hereafter.

An Irish Bog on the Move.

A "BOG" in Ireland has suddenly become nomadic, and is seeking to change its situation. It is stated that the inhabitants of Bealick, near Ballingar, Roscommon, were terrified at the sudden movement of the Corlisk. The bog is a high one, of many hundred acres, and it made such a rapid progress that at dusk fifty acres of the low land had been covered up, destroying crops of potatoes, turnips, &c. The alarm of the inhabitants was extreme.

The Proposed System of Piers.

THE full text of Chief Engineer MCCLELLAN'S report on our new system of Docks and Piers, is as follows:

DEPARTMENT OF DOCKS, ENGINEER'S BUREAU,
NEW YORK, April 26, 1871.

To the Honorable Commissioners of Docks:

GENTLEMEN—The system of construction best adapted to facilitate the rapid and economical handling, loading, and unloading of vessels, and the transportation of freight and passengers to and from the immediate water front, in any particular harbor, will depend upon the nature of that harbor and its approaches, as well as upon the character and extent of the commerce to be accommodated. For a well-sheltered port, where the water front is extensive in proportion to the commerce, where the bottom shelves rapidly, and the daily variations of the tide are not great, the simplest and most appropriate form of construction is a quay or river wall, so located that the largest vessels can float alongside of it at extreme low water. Where the bottom shelves very gradually, it becomes necessary to extend piers so far out that the water near the ends will be deep enough to float vessels. Piers are also necessary in cases where, even when the water deepens very rapidly, it is necessary to accommodate a large commerce along a comparatively limited water front, as well as when it is desirable to afford protection against a rapid current, floating ice, etc. In cases where the rise and fall of the tide is very great, and where the water front is limited in extent, a large commerce can be advantageously accommodated only by some such system as the wet or tidal docks so extensively used in Europe, and of which the docks of Liverpool and London are the best examples.

In arranging a system for the City of New York, it is proper to examine the systems that have been adopted in other ports of corresponding commercial importance. The magnificent docks of Liverpool and London, constructed by such distinguished engineers as Rennie, Telford, Hartley, and others, accommodate the largest commerce of the world, and therefore naturally suggest themselves as fit subjects of comparison with our own proposed system. Such a comparison will point out the extraordinary advantages which the hydrography of the port of New York affords for the purposes of commerce and navigation, and will at the same time show that far greater dock area and wharf facilities can be obtained in this city by a much more simple and far less expensive system than that which has been so greatly admired in the cases of Liverpool and London.

THE DOCKS AND PIERS OF LIVERPOOL.

Liverpool is situated just within the mouth of the River Mersey, a deep and navigable stream, which has, opposite the city, an average width of about 3,900 feet, and a depth varying from 18 to 60 feet, at low water; the rise and fall of the tide is from 18 to 33 feet. The river wall, within which the docks are located, occupies about five miles in length of the bank of the Mersey. The great variations in the tide render it impossible to load and unload vessels advantageously abreast of ordinary quays or piers in the Mersey; the somewhat exposed anchorage is too limited for the great number of vessels that frequent the port, and, were it large enough, the heavy expense and delays of the system of loading and unloading by means of lighters have been found unendurable by commerce. There is then but one system applicable to such a port—that of inclosed wet docks with entrance gates. This system has been admirably carried out in Liverpool. Commenced as early as 1709, the docks have at this time attained colossal proportions. Omitting the Birkenhead docks and other additions since 1854, they cover 610 acres, obtained from the shore of the Mersey between high and low water marks; the river wall projects from 500 to 1,200 feet beyond the original shore line; the length of quay frontage within the docks is 14 miles and 119 yards; the docks are bounded on the river side by a wall 30 to 50 feet high, with an aggregate length of nearly five miles. As a rule, no warehouses surround these docks, only landing-sheds.

The time for entering and departing from these docks is limited to from 2½ to 3 hours each tide, and as the sills of the docks are above low water, there are more than 100 days in the year when vessels drawing 18 feet cannot enter them, and many days when only 16 feet can be carried in. A good deal of difficulty is experienced in keeping these docks free from mud and silt.

THE DOCKS AND PIERS OF LONDON.

The port of London may be said to be confined within that portion of the Thames which extends from London Bridge to the lower end of Bugsby's Beach. Along this portion of the river it averages about 1,210 feet in width at high water, and almost 874 feet at low water, leaving a fraction over 15 feet. The spring tides rise at London Bridge from 17 to 20 feet, the neaps from 15 to 16 feet. Considerations similar to those which determine the dock system of Liverpool have created a corresponding system for the port of London. In the latter case, as in the former, the insufficient river front and anchorage ground, the great daily variations of the tide, the necessity of providing for the cheap and rapid handling of freight, have led the able engineers to whom the problem has been intrusted, to construct inclosed wet docks, similar in principle to those of Liverpool, but differing in some details of construction, *e. g.*, as a rule, the London docks are surrounded by extensive warehouses, the sills of the gates are below the water mark, and the docks have been excavated inside the shore line.

NATURAL ADVANTAGES OF NEW YORK HARBOR.

Having briefly called attention to the hydrographical features and the dock constructions peculiar to the ports of Liverpool and London, I will now, in a very few words, mention the natural advantages of the port of New York, and the general character of the system best calculated to develop these advantages at the least cost of time and money. The City of New York, perhaps unrivalled in its position as a great commercial mart, is situated upon an island formed by three rivers. Of these, the Hudson is chief in volume and extent; this river washes thirteen miles of the shore line of the city, every foot of which distance can easily be made available for the use of vessels of the largest class; it is navigable for 150 miles above the city, and by its connecting canals affords water communication with the Western States and the chain of the great lakes. Through the upper and lower bays the Hudson communicates directly with the ocean, affording a safe and convenient passage to the largest ocean steamers as well as to the smaller coasting vessels.

The East River, although inferior to the Hudson, yet affords a river frontage of 9¼ miles, most of which can be made available for the largest vessels; gives a good communication from the Hudson to Long Island Sound, and through the latter brings New York into close communication with the manufacturing States of New England, while it affords a second approach to the Atlantic Ocean. The Harlem River would alone, in many parts of the world, be regarded as sufficient in itself for the requirements of a respectable commerce. It gives 2½ miles of good water front to the city, and presents the means of obtaining, at a reasonable cost, a second and convenient channel of communication for small vessels between the upper waters of the Hudson and Long Island Sound.

The area of the portions of the Hudson and East Rivers immediately opposite New York, available for anchorage, amounts to 13½ square miles, and this area is perfectly safe, never being rendered dangerous by the winds or waves. The upper bay of New York presents an available area of 14 square miles of perfectly safe anchorage. The lower bay possesses an anchorage of 88 square miles. The total available water-front of the city is 24½ miles. The average rise and fall of the tide along our water-front is 4 3-10 feet. It will thus be seen that—omitting, as foreign to the immediate purpose of this report, the great commercial facilities of Brooklyn and the Jersey shore, localities which are, however, indissolubly connected in interest with New York, and between which and this city no rivalries ought ever to exist—New York possesses advantages which need only to be developed to enable it to accommodate all the commerce that the future can concentrate here.

It requires no demonstration to prove that commerce is the very life-blood of New York, affecting not only the classes directly engaged in it, but all others of the population as well. It is evident that any money judiciously expended in creating facilities which will cheapen, expedite, and render secure the work of loading and unloading vessels, will be well expended, and will yield such abundant returns in the general prosperity of the community as to render it wise to reduce the charges upon commerce, at least, to the lowest point compatible with paying the interest upon the cost of the necessary improvements on the water front, and making good inevitable deterioration. In a commercial mart like this, all port and dock charges, of whatever nature, upon shipping should be reduced to a minimum. The pre-eminent advantages of such a port as New York should never be sacrificed by the short-sighted policy of imposing unnecessary burdens upon commerce.

It will now be well to call attention to the following statement in regard to the tonnage of Liverpool, London, and New York.

STATISTICS OF COMMERCE.*

London, Liverpool, and New York combined.

LONDON AND LIVERPOOL.

Port.	Years.		Sailing vessels.	Steam do.	Tons.
London	1868	Entered	16,886	7,546	6,647,490
London	1868	Cleared	11,058	4,710	3,881,578
Liverpool	1868	Entered	6,921	4,831	4,704,459
Liverpool	1868	Cleared	7,551	4,634	4,573,255

NEW YORK.

Years.		Sailing vessels.	Coastwise.	Tons.
1868	Entered	4,636	2,314	4,251,921
1868	Cleared	4,384	3,939	4,613 858
1869	Entered	5,218	2,500	4,447,374
1869	Cleared	4,591	4,376	5,004,850
1870	Entered	4,833	2,129	4,613,315
1870	Cleared	4,323	4,125	3,912,745

THE TRUE PLAN FOR NEW YORK.

Bearing in mind the relative tonnage of the ports as shown in this statement, also the extremely moderate variations of tide here, as well as the fact that our rivers and bays afford excellent and spacious anchorage grounds and a natural water front incomparably superior to that of Liverpool or London, it is evident that there is no necessity for our resorting to the English system of inclosed docks. It is safe to say that, without reference to its excessive cost, such a system would be absolutely pernicious here. From what has been already stated, it is clear that the arrangement best suited to our wants is a continuous permanent river wall, so located as to widen the river street very considerably; with ample piers projecting from it at sufficient intervals, and so covered as to afford security against the weather, fire, and thieves, whenever necessary. This is the simplest, most convenient, and by far the most economical system that can be suggested. It brings into play all the extraordinary natural advantages of the port, and it affords every facility for the cheap and rapid handling of vessels and their cargoes.

Aware of the importance of locating the river wall and pier head lines so as to avoid any injury whatever to the harbor, while affording all possible facilities to commerce, and regarding this as the most important point to be determined before commencing any work of construction, I obtained your permission to avail myself of the services of Gen. A. A. HUMPHREYS, Chief of Engineers, U. S. A., as a consulting engineer to assist me in the determination of this vital question. I selected Gen. HUMPHREYS on account of the weight attached to his reputation in river and harbor engineering, and also for the reason that his position renders him entirely disinterested in the matter. The question of the location of the river wall and pier head lines of the new arrangement has been very carefully considered by Gen. HUMPHREYS and myself in view of its effects upon the harbor. We have acted with all the light afforded by the data in the possession of the United States Coast Survey, as well as much new and useful information obtained by the surveying parties of this department.

THE NEW RIVER WALL.

We find that the proposed location nowhere reduces the cross section of the river to an area in any case approaching those of the controlling sections of the two rivers, so that the new location will not diminish in any appreciable degree the amount of the tidal wave, nor consequently the scouring effect of the returning ebb; an entirely different condition of things from the probable results of various proposed changes on the Jersey shore. The lines might, except at Corlear's Hook, on the East river, and between Eleventh and Eighteenth streets, North river, be thrown further out without injury to the harbor, but it is believed that the proposed river street—250 feet in width on the North river, and on the East river 200 feet in width from the foot of Whitehall street to Thirty-first street, and thence 175 feet in width—will afford ample facilities for all future requirements of business, while an increase of that width would materially enhance the cost of construction.

On the North river, from the Battery to Eleventh street, the proposed pier head line has been thrown out so far as to give the new piers the same general length as they have in the present arrangement; the same rule is followed in the lower part of the East river, carefully avoiding any obstruction to navigation in the vicinity of Corlear's Hook. On the North river, above Eleventh street, there are no piers proposed until Eighteenth street is reached, where the piers begin again, and gradually increase in length until Twenty-third street is reached, where they attain the length of 500 feet, and preserve that length as far as Sixty-first street, beyond which point the new arrangement has not yet been laid down. In no case will they be extended so far as to interfere with navigation.

A careful examination of the question of sewage has led to the conclusion that it is not desirable to recommend the construction of a longitudinal sewer adjacent to the river; but wherever a sewer pierces the wall it should be so located that its outlet may be at or near the pier-head, instead of at the foot of the slip. The volume and currents of the North and East rivers are so great that, with outlets on the pier-heads, no difficulty can arise by the pollution or obstruction of the rivers from the sewerage matter; hence the system so ably carried out in London finds no application here, even did the topography admit of its employment.

In regard to a railway along the line of the river wall, it is sufficient to say that the proposed width of the river street affords ample space for the construction of any railway that may in the future be determined upon. As nothing can be done toward the practical construction of such a railway until a considerable portion of the river wall is completed, it would be premature to discuss the subject at present, further than to say that such a road can be easily built so as to afford all desirable facilities for the handling and transportation of freight, and the transportation of passengers whenever the proper time arrives.

PLAN OF CONSTRUCTION.

With reference to general sections and materials for the bulkhead walls, I have, with your permission, procured the aid of General Q. A. GILMORE, United States Corps of Engineers, as consulting engineer, and, with his co-operation, have made a very thorough examination of this most important subject. The river wall should be constructed of Beton and masonry, or of masonry alone, as may be best suited for each locality. The nature of the bottom along the river front varies to such a degree that it is impossible to make any plan of wall or foundations applicable to all cases. Along those portions of the river wall where piers and slips are constructed, the average depth of water should be 20 feet when possible, and the wall should rise about six feet above mean high water. With the exception of half piers adjacent to ferry slips and the like, none of the new piers should be less than 60 feet wide, except where some special case requires it. There should be a reasonable number 80 feet and 100 feet wide.

The dimensions of each pile, as well as the character of its construction, must be decided in each particular case by the purpose to which it is to be applied and the nature of the bottom. It is proposed, for instance, to provide on the North river a proper number of piers specially adapted to the grain business, some of which shall permit the erection of suitable grain elevators and storehouses; others for flour; others, again, in different parts of the water front, for the coal, brick, and lumber business, &c. It is also recommended that in every section of the water-front a suitable number of piers shall be reserved for the general purposes of commerce, and not confined to the use of any particular lines of vessels, for, under the existing arrangements, merchants are often subjected to great difficulty and expense from the impossibility of finding

* The above figures, although furnished to this Department by the Bureau of Statistics in Washington, give but an imperfect idea of the total tonnage of New York, because the tonnage of the port is not distinguished from the tonnage of the collection district. This district is described in the Regulations of the Treasury, as including within its limits "the Bays and Harbor of New York; the East River and Long Island Sound as far Eastward as the Connecticut State line, and to the point called Oyster Pond Point on the North shore of Long Island; all of the South shore of Long Island as far Eastward as Montauk Point, the Hudson River as far northward as it is navigable; Staten Island and the adjacent waters, and so much of the State of New Jersey as lies east of Elizabethtown, and Staten Island, comprising the counties of Hudson and Bergen, except all the waters and shores of Newark Bay, and the rivers and bays tributary thereto, the northern shore of the strait or passage known as Kill Von Kull, and all that part of the western shore known as Staten Island Sound or Arthur Kill, which lies northerly of the northern boundary of the town of Rahway." It should be borne in mind, however, that no official record is kept of the entrance and clearance of coastwise vessels, with the exception of the inconsiderable number which contain foreign merchandise and domestic distilled spirits.

accommodations for transient vessels near their warehouses. Under the new arrangement it seems obvious that those concerned in the warehouse business will find it most convenient and economical to locate their buildings along the line of the river streets. The general plans to be adopted must involve the construction of piers with supports of such a nature as to offer the least possible obstruction to the water. The wide practical departure from this principle is one of the most serious defects of the existing system.

I have examined all the plans submitted to you for consideration. The only information which these contain are general ideas, which the projectors think should be adopted; but the want of knowledge of the ground, which is a matter involving the laborious surveys now in progress, deprives them of practical value, except as suggestions for a general system.

THE NEW SYSTEM IN BRIEF.

In brief, the general system proposed is:

First—To construct a permanent river wall of Belton and masonry, or of masonry alone, so far outside of the existing bulkhead as to give a river street 250 feet wide along the North river, 200 feet wide on the East river, from the Battery to Thirty-first street, and 175 feet wide north of that point.

Second—To build piers projecting from the river wall of ample dimensions, adequate construction, and, so far as possible, affording an unobstructed passage for the water.

Third—Whenever it is necessary, to cover these piers with substantial sheds, suitable to the requirements of each case.

In carrying into execution the proposed improvements along the water front of New York, it is obvious that they should be extended only as the requirements of commerce demand.

THE PRESENT HARBOR FACILITIES.

The commerce of New York is now accommodated by the following extent of wharf facilities, viz.:

North river, from the Battery to Sixty-first street, a bulkhead with an aggregate length of 23,163 feet, and an aggregate length of piers of 31,229 feet, with a pier area of 1,606,024 square feet.

East river, from the Battery to Fifty-first street, 26,494 feet of bulkhead, and an aggregate length of piers of 19,139 feet, with a pier area of 716,664 square feet. Thus the bulkhead and piers together give a wharf line of 150,292 feet, or 28½ miles, with a pier area of 2,322,668 square feet. By wharf line is meant all that portion of the river wall and piers that vessels can approach. Considerable portions of this wharf line are practically useless from insufficient depth of water and other causes.

FACILITIES OFFERED BR THE NEW PLAN.

The proposed arrangement of water front, including the new river wall and a far better disposition of the piers, gives on the North river from the Battery to Sixty-first street, a river wall line of 55,743 feet, and a pier length of 37,529 feet, with a pier area of 3,325,600 square feet; and on the East river, from the Battery to Fifty-first street, a river wall line of 27,995 feet with a pier area of about 1,780,000 square feet.

Thus in the proposed system, the piers and river wall together will give a wharf line of about 195,000 feet or about 37 miles, and the piers alone will have an area of about 5,105,000 square feet, sufficient, it is safe to say, to accommodate a commerce vastly greater than that which now finds its way to the water front of New York.

WHERE THE NEW SYSTEM SHOULD BE FIRST APPLIED.

It would thus appear that, for a very long time to come, it willl be necessary to extend the new system over a portion only of the water front between Sixty-first street, North river, and Fifty-first street, East river. Nearly all the commerce of New York is now located between Grand street, on the East river, and the foot of West Eleventh street, on the North river. From the insufficient breadth of the majority of the piers, the lack of width in the river streets, and the consequent difficulty of access, this quarter of the city is entirely too crowded, and it is impossible to transact the shipping business satisfactory in the very region where it is more than probable that the heavy general business of the port must always be conducted. It is, therefore, evident that the new system should be first applied to this portion of the river front, in order to afford relief as soon as practicable.

The proposed arrangement will give between Grand street and West Eleventh street, a wharf line 21,43 miles (greater than the whole existing quay line of Liverpool, including the new constructions at Birkenhead, which amont in all to about 20¾ miles), against any existing line within the same limits of 20.7 miles; and from the superiority of the arrangement in the increased width of the piers, slips, and river streets, and the greater depth of water making every foot available for use, will accommodate with ease a much greater commerce than now exists.

THE COST OF THE WORK.

The cost of the proposed system between Grand street and West Eleventh street will be about as follows, viz.: Four and one-third miles of river wall at $2,500,000 per mile, $10,825,000; piers, $9,175,000—total $20,000,000; or per mile of wharf line, $933,271. In the above estimate for the cost of the river wall the filling of the river street is included but not the paving. In the estimate for the piers, provision has been made for a few, into the construction of which masonsy and iron can enter, but the great majority are to be of preserved wood, built in the best manner, and far superior to the present system. The question of building piers of masonry or iron is simply one of cost, and they can be applied anywhere along the river front whenever it is considered desirable to do so.

ECONOMY RECOMMENDED.

But the cost of building permanent piers is so great that I have not thought it advisable to recommend their general use, especially at a time when money is of such great value, and when taxation for all purposes is so heavy a burden upon the community. I have no doubt as to the immediate necessity of widening the river streets and building a permanent river wall, as recommended; but I think it sound policy to content ourselves for the present wtth constructing piers that will afford all necessary facilities in the way of space, general arrangement, and strength, but mostly of a cheap material, leaving it for other generations, richer than we are, to replace them by permanent structures whenever it becomes expedient to do so.

It is to be understood that the proposed locations and dimensions of the piers are liable to be changed at the discretion of the Board, when the question comes up for solution in each particular case, *e. g.:* A pier laid down as 80 feet in width may, to serve some special purpose in its use, be changed to 100 feet or 60 feet, and *vice versa*. So, too, any special slip may have to be widened or narrowed to accommodate to the best advantage the commerce of the adjacent piers. Sheds are not included in the above estimate, as their construction must vary with the use to which they are to be put.

COMPARATIVE CHEAPNESS OF THE NEW YORK DOCKS.

It may be interesting to call attention to some facts in reference to the cost of the Liverpool and London docks. The Liverpool docks, up to 1854, according to Sir John Rennie, had cost about $50,000,000 in gold, and the quay line obtained by this expenditure was 14 miles, 119 yards; that is, about $3,500,000 in gold per mile; or, bearing in mind the low cost of labor and material at the time these works were executed, I should think it not unfair to say that similar work could not be executed in New York for double the amount. Again, the London docks (not the dock system of London) have a capital of $20,000,000 (gold), and this, it is believed, was wholly expended in the docks, warehouses, etc. These docks have a quay line of 9,570 feet, and hence, according to the above statement, cost at the rate of $11,000,000 (gold) per mile of quay line. And similarly, the St. Catherine's docks of London, with a quay line of 5,110 feet, cost at the rate of $10,600,000 per mile. In a word, the nature of the water front of New York is such that dock facilities equal to those in Liverpool can be obtained under the arrangement proposed at a cost incomparably less than that of those superb constructions.

In terminating this report, it may be proper to repeat that it is not considered advisable to propose to apply the new arrangement of river walls and piers to the entire water front of the city at once, or in the immediate future, but only to provide promptly for the requirements of the existing commerce, and then to extend the new constructions as that commerce increases and requires additional facilities, so that the expenditures shall be distributed over a considerable time, and the burden proposed be in just proportion to the commerce it is intended to accommodate.

Respectfully submitted,

GEORGE B. MCCLELLAN, Engineer-in-Chief.

The Nesquehoming Tunnel.

It is not generally known that a tunnel which, for scientific engineering, and economy, speed and durability of work, is not surpassed by the Mont Cenis or Hoosac tunnels, is being driven by the Lehigh Coal and Navigation Company, of Pennsylvania. The location of the tunnel is near Summit Hill, Pa., and it is being driven for the purpose of doing away with the Switchback Railroad. It is a continuance of an old mining tunnel known as No. 7, and when completed will be nearly a mile in length. The company adopted the location as the most central and desirable, and the old tunnel having been driven 1500 feet to the Mammoth Vein, made a considerable less distance to be cut. Although little known by the public, engineers of celebrity state that the science of tunneling is here illustrated under the most perfect conditions, and that the record of the work is cagerly examined by experts, both here and in Europe. The work, to describe the whole of which would require too much space, was at the beginning prosecuted by hand drilling, but as soon as the Burleigh drills were introduced, they were adopted after trial, and went into operation March, 1870, since which time they have given great satisfaction. The tunnel is driven through the coal measures, cutting each vein known in the region, and after passing through them it penetrates an intensely hard conglomerate, leaving which it enters red shale. A brief description of the Burleigh drills used will be interesting. The drills are driven by condensed air, which is pumped by six 20 horse-power steam engines into a large iron receiving tank, from which it is conducted into the tunnel through a six-inch pipe of cast-iron, and is distributed by hose to the three carriages which support the drills. These three carriages support the drills used for the heading and the first and second enlargements. The heading carriage supports five drills, the first and second enlargements each having three. Motion is given to the drills by the action of condensed air in the cylinder, the piston of which is connected directly with the drill. Their working is far superior to that of any previous process, a three-inch hole having been driven in sandstone in eleven minutes, while the average progress in the hard conglomerate rock is seven feet per hour. The heading is now in the red shale, and is proceeding at the rate of thirty-five feet per week. Work is soon to be prosecuted from both ends of the tunnel, and the boiler and blowing engines are erected and in readiness at the north portal. When under full headway, about sixty feet per week will be made, and at that rate the two headings will meet in September. The enlargements follow upon the heading, and it is expected that trains will run through by January, 1872. The work, when completed, will save great expense and delay in moving trains on the Lehigh Navigation Company's roads, and will be quite as much an object of curiosity to tourists as was the famous Switchback railroad, which has been visited by many thousands.—*The Iron Age.*

MINING SUMMARY.

Pennsylvania.

DISASTER AT WEST PITTSTON.

On Saturday afternoon, May 27th, the breaker over the West Pittston shaft, owned by the Lehigh Valley Railroad Company and worked by BLAKE & Co., of New York, caught fire, and in the course of about three hours was totally consumed or removed. The fire was first discovered in the tower of the breaker at about 12 P. M., and is supposed to have originated from the breaking of a journal of the ventilator, which was used to supply the men in the mine with fresh air. There being but one shaft to the mine, artificial ventilation was necessary. The flames were first communicated to some oiled hemp which was near at hand, and thence spread with great rapidity over the entire building.

As soon as the alarm was given the engineer communicated the signal to the men in the shaft, and at once began to rapidly hoist and lower the cage. Three or four trips were made in this way, and a number of men (at least five) were thus rescued, before the intense heat drove the engineer from his post, where he had remained until himself was badly scorched and burned.

At about 5 P. M., as nearly as we can learn from the conflicting accounts which reach us, the burning building over the shaft was cleared away, and the task of rescuing the men in the mine was begun. Considerable time was consumed in erecting a platform over the shaft and rigging up a temporary carriage in which to attempt the descent of the shaft. In the meantime, however, at about 7 P. M., a dog was lowered to the bottom in a box, allowed to remain there for a few minutes, and hoisted out alive.

At 11 P. M., the temporary cage was lowered carefully for a hundred feet, and the brave volunteers drawn up again, reporting that the air at that depth was not very bad. The rope to which the cage was attached was passed over a pulley and managed by three hundred men belonging to the Fire Department, miners and citizens. The cage was again freighted with volunteers, who cleared away the rubbish and burnt timbers in the shaft and descended to the bottom, which they reached at about 12:30 A. M.

At 12:40 A. M., the carriage was raised containing the insensible but breathing body of ANDREW MORGAN, the first reliable messenger of hope for the salvation of the entombed. The volunteers were nearly overcome from the inhalation of choke damp and heat. The rescued man was found in the east gangway, some fifty feet from the shaft, lying on his face, stripped of nearly all his clothing. They also report the discovery of two horses and four mules, all alive, and that the lamp at the foot of the shaft is still burning. This intelligence created intense excitement among the visitors of this mighty scene, and cheer upon cheer re-echoed among the adjacent mountain ranges. No other men were found, and the searchers, rapidly failing from exhausted nature, dare not explore farther until reinvigorated. Shortly after another detachment of miners were sent down. The signal to hoist was given and the carriage arrived with the information that HIRAM CURTIS had been found dead, sitting against the wall of the mine just outside of a barricade erected by the miners across the east gangway. They brought the dead man to the foot of the shaft and asked for reinforcements to go down to assist in breaking through the wall to get to the men. Upon the wall is inscribed in chalk, "we are all in here."

By about half-past 2 in the morning all the bodies, thirty-eight in number, had been brought to the surface. Of these eighteen were dead, and the remainder, with a single exception, insensible.

A couple of mules are said to have been found alive at the foot of the shaft, where a burning lamp was also found. The published accounts of the accident are very conflicting, but the following verdict of the coroner's jury is probably the most reliable document that has yet appeared:

VERDICT OF THE JURY.

We, the undersigned jurors of the Coroner's inquest upon the bodies of JOHN BURROUGHS, E. R. DAVIS, BENJAMIN JONES, DAVID EDWARDS, and others, being duly sworn and obligated as to our duties, as required by law, respectfully submit that the cause of the death of the persons above-mentioned was from the effects of impure air, caused by improper ventilation in the West Pittston mine, operated by BLAKE & Co., and from the inhalation of carbonic gas, the result of the conflagration of the breaker over the head of the shaft of said mine; that when the breaker took fire there was no means for supplying the men with fresh air, and they were subjected to breathe foul and poisonous gas. The air in the mine continued its natural courses from ten to twenty minutes, when neither fresh air came into the mine nor foul air was expelled, and smoke and carbonic acid was forced clear through the shaft into the gangways and breasts; that the fire was communicated to the breaker from friction of one of the journals of the fan in the breaker, above the engine-room; that BLAKE & Co. took charge of the West Pittston mine on or about January 1, 1871; and furthermore, there is but one air passage for fresh air to descend to the mine, and but one passage for the escape of gas and obnoxious air; and that the said down-cast and up-cast passage of fresh air and foul air were through a shaft 280 feet in depth, having its outlet directly under the breaker, and that no work was in progress at the time of the fire upon any contemplated second shaft, tunnel, slope, or any other construction, above or below the ground, for the supply of fresh air to the mine. Furthermore, that repeated attempts to improve the quantity and quality of the air were made by the said BLAKE & Co., and that each and every one of the successive attempts were inadequate for the proper ventilation, as required by law, an act providing for the health and safety of persons employed in coal mines, section 3, article 7, approved March 30, 1871.

Furthermore, there was negligence on the part of the employés of the company in not keeping the journals of the fan properly oiled. Furthermore, that BLAKE & Co. were working in the mine at one shaft and at one time more than twenty men, and that upon Saturday, May 24, BLAKE & Co. did have in their employ and engaged in mining and producing coal upon one shaft and at one time in the mine not less than forty-three men, in violation of the act of the Legislature of said State herein before referred to, entitled "An act to provide for the health and safety of persons employed in the coal mines;" and furthermore, that T. M. WILLIAMS, Mining Inspector for and in the district on which said shaft of BLAKE & Co. is situated, since the 1st day of January, 1871, visited the mine at least twice, the last time being Wednesday, May 24, 1871, and that he has gone through the mines and inspected the operations of said BLAKE & Co., in producing coal in the said mine, and the said WILLIAMS suggested improvements in the ventilation of the mine; and furthermore, that T. M. WILLIAMS was aware of the violation of the laws of the State in reference to the ventilation of the mines in the anthracite coal-fields by said BLAKE & Co., as

specified by section 3 of said law referred to above, and the said WILLIAMS has not protested or intimated a protest against the said violation against the said law; and furthermore the said T. M. WILLIAMS has failed to perform his duty in exercising due diligence in ascertaining the number of men engaged at one time upon the work in the said mine, and that the said WILLIAMS neglected to exercise his duty, required by law, to order the reduction of force employed at work, or apply to the courts for injunctions to the said operators, BLAKE & Co., from employing more men than that required by law in the production of coal, as set forth in the said act, section 5.

JAMES WELSH, M. BOLIN,
J. FITZPATRICK, J. W. FREEMAN,
S. T. BARRETT, MORGAN JONES, Jurors.

California.

AMADOR COUNTY.

The *Dispatch*, May 6th, has the following: The chlorination works, owned by BREEDLOVE & TARR, near Sutter Creek, were completely destroyed by fire on Thursday of last week. The loss is estimated at $6,000.

THE AMADOR MINE.

The work of retimbering the Eureka shaft progresses, and they are now down about eleven hundred feet.

ELDORADO COUNTY, GEORGETOWN.

A correspondent of the Placerville *Democrat*, May 6th, says: The Taylor Company have the shaft completed, and are pushing the drift towards the ledge at the rate of two feet per day. Mr. HART has leased his claim for six months to E. W. BLAISDELL & J. H. MORGAN of San Jose—they having the privilege of buying at any time during six months for $3,500. The St. Lawrence claim having been crushing rock, yielded over $15 per ton. They are pushing down their shaft and the ledge is improving. The Eureka is running, but as yet has not cleaned up. Everything looks finely. J. H. ADAMS and others, of San Jose, are opening a valuable claim below Garden Valley.

INYO COUNTY.

According to the *Independent*, April 29th, improvements at the immense mill and mine are completed, and Superintendent WINTERS will find things in tip-top shape. The tramway will be finished today; the turbine wheel is ready for motion. Six Wheeler pans have been added to the mill, and on the 4th of May the works start up for all time. There have been some forty men employed; this force will now be transferred to the mine. The Deep Spring mill is now in motion, operating successfully, and getting out good bullion. During the week ending Saturday the 22d inst., there were shipped from the furnace of Mr. BEAUDRY, at Cerro Gordo, 1,225 bars, weighing eighty-four pounds each.

Colorado.

From a recent number of the Fairlove *Post* we take the following concerning

THE GRAND ISLAND DISTRICT.

The Idaho is one of the most promising lodes in Grand Island District. It lies to the eastward of this place, and in what some term the "Caribou belt." There is some propriety in speaking of this section as the "belt," as within a strip of country, a half a mile wide and two miles in length, a large number of rich lodes have been found, which, from the external evidence of direction and the internal evidence of the surface ore, are believed to be but different parts of the same continuous veins. Still it is not proper to speak of this belt as *the* silver belt, as there are plenty of good lodes outside of this belt. Yet it is considerable to say for a lode, that it does lie within this belt. This lode was discovered in August last by WALTER B. JENNESS & Co., who opened and worked it during the fall. The shaft is now about fifty feet deep, and shows a vein of ore eighteen inches in breadth. It is well timbered throughout, and is in good working order. A statement of receipts and expenditures shows that during a few weeks of last fall there was taken out a quantity of ore that sold at the Boston and Colorado Smelting works for $4,822. This ore assayed from 160 to 482 ounces per ton, averaging 321.50 ounces per ton. The cost of mining was $249 60, and the cost of hauling to Black Hawk, $280, leaving a net profit for taking out this ore of $4,290 40. This is a magnificent showing for a mine only fifty feet in depth. We hope to see this valuable property worked during this summer with vigor. We have no idea what the intentions of JENNESS & Co. are in regard to the matter, but we hope they will not offer their property for sale. Any large sum would be too much to ask for a mine only fifty feet deep, and any moderate sum would be too small to meet our ideas of the value of the property. And we here make the remark generally, that selling mines to Eastern companies has, as a rule, proved disastrous to the country, and that under any circumstances it is a mistake to sell a mine before it is a mine; that is, to sell a property upon which development has only just commenced. It is far better to make a mine indisputably valuable by development before putting it in the market.

From the Central *Register*, of May 23d, we take the following history of the same district: This mining district took its name from an island formed by two forks of North Boulder Creek. It was organized in January 1861, SAMUEL P. CONGER, who has been identified with its fortunes ever since, being the first Recorder. Considerable prospecting for gold had been done during the present summer and fall in the neighborhood of THOMAS HILL'S ranche, but without marked success. In the fall of 1861 Mr. CONGER discovered the diggings on the gulch below the present town of Caribou, and with his partners took out, by sluicing, the sum of $700. The first prospecting for lodes was done by SAMUEL P. CONGER, JOHN VIRDEN, WILLIAM SCHOOLFIELD and JAMES VIRDEN. The first lodes found were in Conger and the Perigo. These lodes prospected were all gold. These same parties found the Caribou blossom rock, but as it would not give a color by panning, no effort was made to find the lode. In 1862 Mr. CONGER and HIRAM PERIGO again worked the gulch with good results, and sunk on the Perigo and Conger lodes. The gulch was also worked by Dr. MACK, Mr. WILLOWBY and Mr. ORVIS. The only lodes discovered and recorded up to 1868 were the Conger and Perigo. These prospected well enough to work for pay, but there being no mills to work within a reasonable distance and no roads, none of it was ever run in a mill, and the district was practically abandoned by miners for several years. All the provisions consumed and tools used had to be packed in, over a tedious route. Notwithstanding this, the Perigo was sunk thirty feet, and the Conger eighteen feet, the most of the work being done in 1863 by Messrs. PERIGO, LANG and PUGH. In 1868 Mr. CONGER was up on the Laramie plains, and saw at the end of the track on the Union and Pacific road, which is now Laramie City, several boxes of silver ore from the State of Nevada, which was being shipped East. He obtained permission to examine it, when he remarked, "if that was silver ore, he knew where there was a plenty of it." He was the more anxious to see this ore, as he had received the Central City *Register*, and in that had read descriptions of the silver ores of Georgetown. Taking a few small pieces he almost immediately returned here to his old stamping ground, and commenced searching for the blossom that resembled the Nevada silver ores. He knew he had seen such rock in his prospecting, but could not tell exactly where. His search during the fall of 1868 was fruitless, but as soon as the snow was off in 1869 he returned and resumed the search. He was not long this time in finding the blossom rock, and within a few days determined upon the locality and direction of the lode. This was in June, 1869. He dug a prospect-hole to strike the lode, and believed he was over or near it, but did not fairly get to the walls of the crevice. He then returned to Central City, and by assay of the ore found, was satisfied that he had discovered a true silver lode. In August of the same year WILLIAM MARTIN and GEORGE LYTEL came up here to examine, and perhaps to work the Conger lode before mentioned. (Another vein, having the direction and more of the characteristics of the main veins, has since been discovered and named the Conger; so the first one, for distinction, is called the Little Conger. The last Conger is owned by the discoverer, whose name it bears, and Capt. R. W. BUFORD, now in Arizona.) Messrs. MARTIN and LYTEL were soon followed by Mr. CONGER, who showed them his prospect-hole, from which he expected great things. WILLIAM MARTIN went to work in the same hole, and in less than two feet uncovered the lode which these parties named the Caribou—a lode that is destined to become as widely known as the Comstock of Nevada, the Poorman of Idaho, or the Emma of Utah. A company was then formed for developing the lode, consisting of the following parties: WILLIAM MARTIN, GEORGE LITEL, SAMUEL MISHLER, HUGH MCCAMERON, JOHN PICKLE, and SAMUEL P. CONGER. The capital stock of this company was *grit*; the working capital *muscle*. They went in as equal partners, some of them to work the lode, the others to continue their usual avocations and furnish grub and material. During the summer and fall, while the lode was being opened, they took out ore, which they hauled to Professor HILL'S Smelting Works, Black Hawk, a distance of eighteen miles, and sold for $2,300. During this time, the Poorman, a large vein, parallel, and about 200 feet north, was discovered. The Caribou was worked by these parties until January, 1870, when CONGER sold and traded his interests in the Caribou, getting his partner's interest in the Poorman. The Caribou Company continued to mine until spring, when, during the wet season, they shut down and turned their attention to building a road, over which they could more cheaply send their winter's accumulation of ore to the smelting works. With the opening of spring came a small army of prospectors, who camped upon the present site of the town of Caribou, and overran the whole country, from Left Hand on the north to South Boulder on the south. With the incoming of this hardy, jovial, enthusiastic crowd the early history of this district appropriately ends. Its rapid growth in the spring of 1870 marks an era, and is a subject for another chapter.

From the Central *Register* of May 23d, we extract the following item of news:

THE GREGORY SECOND,

Like the Kansas lode, must needs lay idle three or four years, before any one had the nerve to lease or attempt to work it, the huy and cry throughout the country being that they were worthless, and never could be made to pay a cent profit, either to the companies owning the different claims, or to the parties wishing to lease. The work that first brought the lode into notice, was prosecuted by a firm whose name we were unable to learn. They operated quite a while, without reaping anything like pay for their time or money; finally, they gave it up in disgust. Soon after this, mining matters came to a stand still in Gregory district, and every lode of importance shut down. A few of our old miners wisely came to the conclusion that there was pay in the lode, and that the only thing necessary to get it was to go after it. Such were the means of opening up this, the best paying lode in Gregory district, for the number of men employed. Commencing at a point where the lode crosses the PAT CASEY road, every claim is being worked, but with one or two exceptions, as far as BAXTER'S stable in the gulch. ROBERTS & LINSEY are working the claim adjoining the road. The shaft is one hundred feet deep, crevice small; but, from the present indications, we should judge that it will soon open out into a fine body of ore. At present, the pay material runs three ounces per cord. The next claim but two west, JOHN B. FITZPATRICK & Co. have leased from the United States Gold Mining Company. They are down to a depth of two hundred feet, the ore-vein averaging fifteen inches in width. The drift running west thirty feet from the shaft, has a crevice of mill-ore eight feet wide, over which there is a back-stope seventy-five or eighty feet high. This drift is being driven with all possible speed, so as to break through into an adjoining shaft, for the purpose of securing better ventilation. The drift running east twenty feet from the shaft, has a vein of ore fifteen inches wide, mostly first-class, which is sold to Prof. HILL, and is worth from $30 to $60 per ton. The second-class, under stamps, yields four ounces per cord. Next to JOHN B. FITZPATRICK & Co., on property belonging to the same company (United States), RULE & Co. are operating. The shaft has reached a depth of 175 feet. At this point, the ore-vein is from three to four feet. The adits run east and west, each carrying fine pay rock, which runs all the way from five to twelve ounces per cord. Just beyond this, on the west, the Gregory Second G. M. Co's property has been leased by Messrs. CAVE & MELLOR. They are now down 200 feet, and have a crevice of ore ten to twelve inches in width. At present they are not sinking. Ten feet above the bottom of the shaft, a level has been run east one hundred feet, through a continuous vein of ore that will average four feet in width. They have just commenced back-stoping this "lift," which is fifty feet high, where another level has been run forty feet, that has the same characteristics of the lower, having an average crevice of three feet. The high ground above this level is sixty-five deep. Above this, the pay was worked out to the surface, in an early day. The average yield of the stamp-mill ore from this mine is four and a half ounces per cord, while the first-class, or that sold to the smelting works, is worth $80 per ton. DAVIS & Co. are mining on the next claim but one west, and are down seventy feet. The crevice in the shaft is four feet wide. Forty-five feet from the surface, drifts are being run both ways. The east adit, twenty feet from the shaft, carries a good ore-vein, eighteen inches wide, while the one running west, now fifty-five feet in length, has a crevice similar to that east, which carries throughout its entire length eighteen inches of pay. They hope to break through into their west shaft to-day or to-morrow, when work will be prosecuted with greater vigor. The great drawback just now is foul air; so much so that it is barely possible to keep a candle lighted. Above both drifts, there are back-stopes forty-six feet deep, that will furnish a great quantity of "truck," that pays seven and eight ounces per cord. West of DAVIS & Co., HAWKINS & Co. are working the claim in the gulch. Their shaft is fifty feet deep; twelve or fourteen feet from the bottom of the same they are drifting west. The crevice matter is a soft, decomposed talc, with pyrites of copper and iron disseminated throughout the vein, two and one-half feet wide. This does not run so well as that being raised from the claims east, but it is improving in quality and quantity, as work progresses. We were highly pleased with the manner in which the different mines on this lore are being worked. From the Casey road to Gregory gulch, all are in good condition, with a vein that is nearly uniform in width and quality. The timbering is done with a view to safety, and the per centags of accidents the last two years has decreased fully one-half. The generality of mines that the owners thereof have leased to different parties, are worked, it is true, with a view to getting out large quantities of ore within a specified time, but notwithstanding the haste in driving work, the mines as a whole are, comparatively speaking, safely secured from accidents.

WATERMAN'S twenty-stamp mill, at the head of the Eureka gulch, is running steadily on ores from the Flack lode.

Jo. HARPER'S ten-stamp mill, in Quartz Valley, is running steadily on ores from the California lode that are paying well.

Idaho.

FLINT DISTRICT.

The editor of the Owyhee *Avalanche* was shown, in JAS. H. GARDNER'S safe, nine large bars of bullion which C. S. MILLER brought over from Flint. They were about double the size of ordinary building bricks, and were truly a goodly sight. This bullion is the product of ore from the Leviathan mine, owned by Mr. MILLER, and worked by him in the rising Star mill. It is confidently expected that the Rising Star Company will resume operations the coming summer, and Flintites are jubilant thereat. That company have 1,100 cords of wood on hand, besides abundance of salt and other material. Flint District is again holding up its head. Beyond a doubt, there are a large number of rich mines there which only require development and proper working to prove what we have always contended it to be, a first-class mining camp.

GOOD ORE.

The Reese River *Reveille*, of May 23, contains the following: A lot of twenty-seven tons of ore, from the Monitor ledge, belonging to the Monitor Company, of Belmont, has just been worked at the Manhattan mill in this city, which surpasses in richness any previous lot brought here from Nye county. Six tons, set aside as first-class, gave a pulp assay of $1,241 per ton; the balance of twenty-one tons, designated as second-class, assayed at the rate of $626 per ton. Considering the size of the lots, this is a very rich yield. The Monitor ledge is situated about two miles from the town of Belmont.

WHITE PINE COUNTY.

We are informed, says the White Pine *News*, of May 17th that the International Mill (60 stamps) will be started up to-morrow, commencing with five stamps, and starting five at a time until the whole are running. The tramway is running right along, with but few pauses. The wire is now tightened, and no jerking attends its movements.

Utah.

From the Ogden *Junction*, of May 20, we take the following regarding the establishment of smelting works at that place. It will be remembered that we have also several times spoken of the advantages of the same location. We have on several occasions drawn the attention of our business men to the importance of establishing works in this city for the reduction of ores, and to the folly of allowing the fortunes to be made out of such an enterprise to pass into the hands of outsiders. We urge this matter upon their notice once more, with the warning repeated that if they do not immediately seize the opportunity before them, capitalists with eyes to see, and brains to profit by it, will come and take it up right under their noses. We are situated in the very best spot in the mountains for the establishment of smelting works. The three railroads meet right at our doors, and we are in the centre of a district containing vast mineral resources. Every facility that could be desired for the transportation of ores is at hand, and if reduction works of some kinds were established in Ogden, the stuff would begin to pour in at once from a hundred places, about which no noise has yet been made in the mining world. Close to our quiet town a number of valuable lodes are being developed, which will yet cause a rush to the Junction city. Among them are the following: The Leopard and the Magnolia, in Ogden Cañon, are both rolling out good paying ore. Tunnels about forty feet in length have been bored into both the mines, and experienced prospectors have pronounced the indications as the best they have seen in Utah. The Cinnebar lode, discovered by Dr. NELLIS, Mr. WILLIAM DRIVER and others of this city, promises to be a rich thing in quicksilver and other metals. At a meeting of the claim-holders on Thursday evening last, a contract was let to work it, and all interested are sanguine of success. The Golden Gate, with a shaft thirty feet deep, is turning out ore that assays $140 of silver to the ton. Specimens from the Morning Star, assayed in St. Louis, show seventy pounds of tin to the ton, besides portions of antimony, arsenic, and silver. A quantity of ore from this mine has just been shipped to New Jersey and St. Louis for further assays. The Uncle Sam in Strong's cañon, a new discovery, yields rich specimens containing silver, iron, and antimony. The Black Hawk, also a new discovery, gives promise of high-grade ores in great abundance. The King Bee has a shaft of forty feet, and turns out gold-bearing quartz, about which the company working it do not wish to say much at present. These are a few of the claims now being steadily worked, in the immediate neighborhood of Ogden. All that is wanted to develop them is capital, and all that is needed to bring the capital necessary, is reduction works, near enough to the mines to warrant the making of roads, and the hauling of the ore. With the present high freight tariff on the railroads, it is useless to talk of shipping the stuff to other places, but the establishment of reduction works in Ogden would give life to the mining interest, revive mercantile activity, and give general impetus to trade. Let our go-a-head men, if we have any in town, form a company to establish these works. A large capital is not required at first, a twenty-five horse power engine and boiler is offered by one gentleman towards the enterprise, and there are no doubt others who desire to assist. If this is laid hold of by our own folks at once, there is money in it for them, and prosperity for the city.

MOUNT NEBO DISTRICT.

W. H. HOWLAND has just returned from Mount Nebo District in Juab county, which he calls headquarters. Mount Nebo is the highest peak in the Territory, and Mr. HOWLAND says that the mines are on a scale corresponding with the altitude of the mountains in which they are found.

MARKET REVIEW.

The Coal Trade.

ANTHRACITE.

NEW YORK, June 2, 1871.

WHOLESALE.—Continued dullness characterizes the coal trade. The principal event of the past week was the Scranton sale of 80,000 tons. Since the sale the market has been unusually dull, to the surprise of most dealers, whose opinion was that if prices "touched bottom," a brisk trade would ensue. There is, however, no rule that holds good for the coal trade, and this has been manifested many times.

The Scranton sale was thronged, the majority, however, of those present came as spectators. The buyers seemed entirely at a loss as to what price they were prepared to pay, and any casual observer would have taken them to be a lot of cattle dealers instead of coal buyers, and men posted in their business. The sale, however, passed of briskly toward the end, and some 90,000 tons of coal were sold, instead of eighty. The prices obtained were much lower than the trade generally anticipated, but about the same that we gave, in our last issue as the actual market value.

Of the 80,000 tons offered, 12,000 were of Lump, 10,00 of Steamboat, 16,000 of Grate, 10,000 of Egg, 20,000 of Stove, and 12,000 of Chestnut. Lump sold at an average of $4 82½; Steamboat at an average of $4 85½; Grate at an average of $5 03½; Egg at $5 15 throughout; Stove at an average of $5 85; and Chestnut at an average of $4 62½. The average price of all the coal sold was $5 05¼.

The following shows the highest and lowest prices obtained to-day, with a comparison of the prices obtained for each grade at the last sale, on the 30th of November, 1870:

	MAY 31.	NOV. 30
12,000 tons Lump, at	$5 00a4 65	$3 55a3 47½
10,000 tons Steamboat, at	5 00a4 70	3 60a —
16,000 tons Grate, at	5 00a5 05	3 80a 3 75
10,000 tons Egg, at	5 15a —	4 00a 3 97½
20,000 tons Stove, at	6 00a 5 77½	4 55a 4 50
12,000 tons Chestnut, at	4 60a4 65	3 50a —

The coal was mostly taken in small lots, and one peculiarity of the sale was the absence of buyers in the interest of the large steamship companies, who evidently have concluded to use Cumberland coal hereafter. The following are the prices of the Delaware and Hudson Canal Company *to contractors*, deliverable on board vessels at Rondout, until July 5th: Furnace, Lump, $5; Steamer, Lump, $5 20; Grate, $5 50: Egg, $5 75; Stove, $6; Chestnut, $5 20. If there is any coal left after the contractors are supplied, it will be for sale at an advance of from 20c. to 25c. per ton. Freights from Rondout to New York by the company's boats or barges, 65c. per ton.

The Lehigh Coal and Navigation Company have the only Lehigh coal for sale in the market. The Small Lump, $6 75; Broken and Egg, $6; Stove, $6 50; Chestnut, $5 50, at Port Johnston. Freight to New York, 50c. per ton.

The following are the prices for Scranton coal; for surplus left from the sale. Lump, $5 00; Steamer, $5 25; Broken, $5 50; Egg, $5 75; Stove, $6 00; Chestnut, $5 25, delivered on board at Elizabethport. Freight to New York 50 cents per ton.

The following are the line prices for old company's Lehigh coal at Mauch Chunk: Lump, $4 50; Broken and Egg, $4 00; Stove, $4 25; Chestnut, $3 50. Through freight to Elizabethport, $2 75; to Port Johnston $2 78.

There is very little if any Schuylkill coal in the market. Messrs. G. B. LINDERMAN & Co. are offering a first-rate grade of coal, known to the trade as the "Franklin coal," at the following quotations: Lump and Steamer, $5; Broken, $5 40; Egg, $5 75; Stove, $6; Chestnut, $5 25. We wish to call the particular attention of our readers to this coal. It is a grade softer than Lehigh, but otherwise is strictly first-class.

The Wilkesbarre Coal and Iron Company have issued new prices under date of June 1st. They are as follows: Lump and Steamer, $5; Broken, $5 40; Egg, $5 75; Stove, $6; Chestnut, $5 25; delivered at Hoboken or Port Johnston, N. J.

It is our opinion that coal has not as yet reached the figures necessary to cause an active business. We must have prices that will enable city retailers to put it in our cellars at about $7 50 per ton for Stove size; otherwise the consumers will not lay in their supplies freely. We dislike very much to bear the market, but we feel satisfied that the community is entitled to coal at these figures, which will yet leave a good profit to all concerned in the trade.

The Hazleton and Lehigh districts are yet in suspension, without any prospects of settlement. We warn the men that they are losing their best opportunities for this year's business, and to hold out thus obstinately when fair wages are offered them will prove their ruin.

FREIGHTS.—In consequence of extra demand for vessels at Elizabethport, to transport the coal sold at auction, freights are a shade higher.

RETAIL.—There is little doing in this branch of the trade. Prices range from $7 50 to $9, according to the quality, delivered.

CUMBERLAND COAL.—The Cumberland coals are selling well to steamers and manufacturers. It is very gratifying to this branch of the coal trade to find none of their new-made customers in the list of purchasers at the Scranton sale. When the superior steam-generating qualities of these coals are more generally understood, we bespeak for them a more wide-spread circulation among manufacturers who now think there is no coal as good as Anthracite. The Consolidation Coal Company quote a steady demand at $6 50 in schooners and $7 00 alongside in barges. Freights unchanged.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending May 27, 1871, compared with week ending May 28, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
Phila & Reading R.R.	35,568	970,397	108,689	889,613
Schuylkill Canal	3,097	68,125	35,941	151,092
Lehigh Valley R. R.	65,194	1,311,636	26,839	516,912
Lehigh & Sus. R. R.	20,264	374,651	42,940	269,815
Lehigh Canal	16,036	80,402	10,247	24,526
Scranton North	14,574	256,047	9,218	9,218
" South	38,815	714,149	21,820	21,820
Penn. Coal Co., rail	24,580	428,100	22,899	26,510
" " " canal	1,076	4,293	....	....
Del. & Hud. Canal Co. East	59,431	392,539	17,625	22,295
" " West	5,796	176,415	3,402	55,962
South	1,537	31,907	756	13,476
Shamokin	14,519	156,116	2,222	39,025
Trevorton	7,320	125,935	12,011	245,752
Lykens Valley Coal Co.	3,202	31,467	....	....
Wyoming South	2,643	5,650	2,263	23,817
Wyoming North	4,024	55,243	....	....
P. N. Y. C. & R. R. Co.	5,962	121,328	3,599	39,800
Williamstown Co'y	4 442	107,077	....	....
Big Lick Col	2,289	11,977	2,794	45,780
Total	314,361	5,340,663	323,775	2,401,405
1870	.....	2,401,405	314,361	
Decrease	.....	2 939,258		
Increase			9,414	

* Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending May 27, 1871, compared with week ending May 28, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. R. R.	19,956	313,944	29,409	461,622
C. & O. Canal	17,616	142,736	19,768	210,811
H. & B. T. R. R.	7 662	120,733	10,418	149,655
Harrisburg & D.	16 750	316,545	18,132	321,812
L. V. R. R.	1,466	6,622	.....	37,725
P. & N.Y.C. & R. Co.	5 638	89 858	7,170	119,615
Cumberl'd Branch	3,406	34,327	886	29,853
" " Canal	3,442	29,944	6,526	63,672
Total	75,966	1,054,709	92,309	1394,765
Increase.			75,966	1054,709
			16,343	340,056

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending May 27, 1871-Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871.. tons ct	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	42984 06	28182 15	272027 17	422265 12
Upper Lehigh Region		3981 15	4614 06	44434 00
Beaver Meadow Region		4577 00		21399 14
Hazleton Region	35 11	9239 05	2422 05	42348 11
Mahanoy Region				
Tresckow Region	110 10		1153 13	
Mauch Chunk Region	5790 06		23342 14	30089 18
Totals	48920 13	45980 15	309560 15	561197 15
Increase				
Decrease	2939 18		251637 00	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	42939 17	20264 11	269815 04	374651 01
Forwarded East of Mch Chunk by Canal	2076 14	18773 13	10871 16	84118 10
Delivered at and above Mauch Chunk	1174 00	823 19	21564 15	15789 15
Delivered to L. & B. R. at Plymouth Bridge	195 16	5819 05	195 16	76035 11
L. V. R. R. at Packer'n	2534 06	299 07	7113 04	10611 18
Totals	48920 13	45980 15	309560 15	561197 15
the above there was transported on acc'nt of L. C. & N. Co.	6805 06		31594 01	46743 15
W.-B. C. & I. Co.	34448 10	11775 18	232067 15	171260 06
Totals.	41253 16	11775 18	263661 12	218004 01
Increase	29477 18			
Decrease			45657 18	

Lehigh Canal Coal Trade.

Shipped for the week ending May 26, 1871.

	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total from Mauch Chunk Region,	9838 18	14138 19
" " Beaver Meadow "		7 18 12
" " Mahanoy "	92 14	892 14
" " Hazleton "		1246 00
" " Upper Lehigh "		
" " Wyoming "	215 02	7581 18
Total	10246 14	24528 03
Corresponding week last year	1035 16	8042 14
Increase		
Decrease	7789 02	55874 11

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, May 27, 1871:

From St. Clair	38,430 14
" Port Carbon	7,760 04
" Pottsville	2,237 15
" Schuylkill Haven	32,945 16
" Auburn	7,887 18
" Port Clinton	19,494 15
" Allentown and Alburtis	51 09
" Harrisburgh and Dauphin	18,132 00
Total paying freight	127,039 11
Coal for Company's use	2,065 13
Total for week	129,096 04
Previously this year	1,073,193 07
Total	1,202,289 11
To same time last year	1,283,862 18

Report of Coal forwarded by Pa. & N. Y. R. R. Co., for week ending May 27, 1871.

	ANTHRACITE. Tons. Cwt.	BITUMINOUS. Tons. Cwt.
By Rail	3,899 03	7,170 05
Previously this year	35 901 01	112,444 18
Total by Rail	.....	.....
By Canal	.....	.....
Previously this year	.....	.....
Total by Canal	.....	.....
Total for the year	39,800 04	119,615 03
To the same time last year	121,326 16	89,858 00
Decrease	81,626 12	
Increase		29,757 03

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending May 27, 1871, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt
Total Wyoming	18,232 06	104,060 00
" Hazleton	125 10	222,311 17
" Upper Lehigh		442 06
" Beaver Meadow		75,327 06
" Mahanoy	13,661 04	193 220 03
" Mauch Chunk	78 13	2,369 11
Total Anthracite	32,097 13	597,791 03
Bituminous Coal from all sources		37,725 00
Total by rail and canal	32,097 13	635,516 03
Same time last year	86,764 17	1,536,673 07
Increase		
Decrease	54,667 04	901,157 04
Forwarded East from Mauch Chunk by rail	26,839 12	516,912 00
Same time last year	65,194 01	1,311,836 02
Increase		
Decrease	38,354 09	794,924 02

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	26,839 12	516,912 00
To N. C. R. R., at Mount Carmel		1,890 17
Forwarded North from L. & B. Junction	3,839 03	39,973 18
" West	756 00	13,476 00
" South	2,222 00	39,025 01
To L. & S. R. R. at Packerton for rail	82 03	2,839 09
Delivered at M'h Chunk		420 18
Delivered on line of road above Mauch Chunk	225 16	4,112 16
Delivered above Mauch Chunk for use of L. V. R.R.	958 05	20,152 04
To L. & S. R., at Penn Hav., for railroad		94 10
Do. for canal		7,128 09
At M. Chunk for canal	92 14	4,266 02
Total Anthracite	32,097 13	597,791 03
Bituminous Coal		37,725 00
Total all kinds	32,097 13	635,516 03

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday May 27, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B. & O. R. R. Co Tons. Cwt.	Total. Tons. Cwt.
1871	19,768 03	29,408 17	49,177 00
1870	17,615 13	19,956 07	37,572 00
Increase.	2,152 10	9,452 10	11,605 00
Decrease			

YEAR.

1871	210,811 01	461,622 11	672,433 12
1870	142,735 13	313,944 12	456,680 05
Increase.	68,075 08	147,677 19	215,753 07
Decrease			

Cumberland Branch.

WEEK.

1871	6,526 07	885 19	7,412 06
1870	3,442 01	3,405 17	6,847 18
Increase.	3,084 06		564 08
Decrease		2,519 18	

YEAR.

1871	63,672 04	29,853 05	93,525 09
1870	29,944 11	34,327 18	64,272 09
Increase.	33,727 13		29,253 00
Decrease		4,474 13	

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, May 27, 1871.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt
From St. Clair	38,420 14
" Port Carbon	7,760 04
" Pottsville	2,237 15
" Schuylkill Haven	32,945 16
" Pine Grove	6,527 05
" Tamaqua	19,494 15
" Harrisburg	
" Dauphin	6,945 01
Total	114,331 10

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	10,598 02
" Mill Creek "	2,315 06
" Schuylkill Valley Scales	1,768 19
" Mt. Carbon "	2,399 14
" Cressona "	15,847 19
" Pine Grove "	
" Tamaqua	1,753 03
Total	34,618 08

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	2,939,11
" Shamokin	4,215 18
" Herndon	
Total	7,155 09

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	775 03
" Lebanon & Pine Grove Branch	669 08
Total	1,444 11

CONSUMED ON LATERALS.

From Frackville Scales	693 13
" Mill Creek "	421 14
" Schuylkill Valley Scales	577 09
" Mt. Carbon "	293 13
" Cressona "	216 15
" Pine Grove "	15 06
" Tamaqua "	85 04
Total	2,308 17

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	51 09
" " Alburtis, " "	
" " Oreland, G. & N. Br.	164 06
" " Connecting R. R. "	
" " Willow Street R. R.	27 18
Total	243 13

BITUMINOUS.

From Harrisburg	11,186 19
" Connecting R. R., G. & N. Br.	
" Junction R. R.	119 01
Total	11,306 00

COAL FOR COMPANY'S USE.

Anthracite	1,793 01
Bituminous	272 12
Total.	2,065 13

RECAPITULATION.

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val. Branch	114 331 10	30,402 19	83,928 11
For Shipment by Canal	34,618 08	2,103 12	32,514 16
Shipped Westward via Northern Central R. R.	7,155 09	2,718 15	4,436 14
Shipped West or South from Pine Grove	1,444 11	238 02	1,206 09
Consumed on Laterals	2,308 17	1,451 07	857 10
Lehigh and Wyoming Coal	243 13	4,214 05	d 3,960 12
Total Anthracite paying fr'gt	160,102 08	41,119 00	118983 08
Bituminous	11,306 00	9,268 07	2,037 13
Total of all kinds paying fr'gt	171,408 08	50,387 07	121021 01
Coal for Company's use	2,065 13	3,679 01	d 1,613 06
Total Tonnage for Week	173,474 01	54,066 08	119407 13
Since Dec. 1, 1870	1426606 18	1430607 18	d 3,911 00
Total to date	1600170 19	1484674 06	115496 13

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	34,377 00	2,388 10	31988 10
" Port Clinton	1,564 00		1,564 00
Total Tonnage per Week	35,941 00	2,388 10	33552 10
Since Dec. 1, 1870	115 150 17	62,746 05	52404 12
Total to date	151,091 17	65,134 15	185957 02

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, May 27, 1871.

	Tons. Cwt.
From Port Carbon	
" Pottsville	
" Schuylkill Haven	34,377 00
" Port Clinton	1,564 00
Total for week	35,941 00
Previously this year	115,150 17
Total	151,091 17
To same time last year	65,134 15

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending May 27, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal	17,625 00	22,281 00
By Railroad East	3,402 00	55,962 00
" West	756 00	13,476 00
" South	2,222 00	39,025 01
TOTAL TONS.	24,003 00	130,743 00
For the same period last year.		
By Del. and Hud. Canal	59,431 00	392,539 00
By Railroad East	5,796 00	176,415 00
" West	1,537 00	31,907 00
" South	14,519 00	156,116 00
TOTAL TONS.	81,273 00	756,977 00

Shamokin Coal Trade.

For week ending May 27th, 1871	12,010 13
Same time last year	7,320 08
Increase	4,690 05
Decrease	
Total amount shipped to date	245,751 13
Same time last year	126,923 15
Increase	119,817 16
Decrease	

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending May 27, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	22,899 1	26,509 15	24,580 1	428,096 19
" Canal	— —	— —	1,078 9	4,196 1
Total	22,899 1	26,509 15	25,658 10	32,293
Decrease 1871, 405,883 5 tons.				

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, May 27th, 1871.

	WEEK.	SEASON.
North	26,845 13	28,859 06
South	2,221 15	39,025 00
Total	29.067 08	67,884 06
Corresponding time in 1870:		
North	46,867 10	910,686 14
South	14,519 06	156,116 01
Total	61,086 16	1,066,802 15
Decrease North	19,721 17	881,827 08
Decrease South	12,297 11	117,091 01
Total decrease	32,019 08	998,918 09

Delaware, Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna and Western R. R. for week ending May 27, 1871.

	Week. Tons. Cwt.	Year. Tons. Cwt.
Shipped North	9,218 15	
shipped South	21,819 15	
Total	31,038 10	46,996 12
For the corresponding time last year:		
Shipped North	14,574 18	256,047 8
Shipped South	33,815 —	714,149 9
Total	53,389 18	970,196 17
Increase	.....	.....
Decrease	22,351 8	923,200 5

Huntington and Broad Top R. R. Co.

For week ending May 27, 1871	10,418 tons.
Same time last year	7,662 "
Increase	2,756 "
Decrease	.....
Total amount shipped to date	149,665 "
Same time last year	120,733 "
Increase	28,922 "
Decrease	.....

Prices for Coal at Mauch Chunk.

May 1871.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein f.o.b. at Phila.	$ —
Lemon " " "	—
Cumberland Vein Coal	—
Consolidation Coal Co.'s on board N. Y.	6 75
Maryland Coal Co. "	6 75

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK, May 30. R. A.	W. A.	AT PHILADELPHIA, May 29. R. A.	W. A.
Lump	$— —	$— —	— —	— —
Steamer	6 50	— —	— —	— —
Broken	7 50	— —	— —	— to —
Egg	—	to —	— —	— to —
Stove	— —	— —	— —	— to —
Chestnut	— —	— —	— —	— to —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	— —	— —	— —	— —
Broken	— —	— —	— —	— —
Egg	— —	— —	— —	— —
Stove	— —	— —	— —	— —
Chestnut	— —	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A. 7 50	W. A.	@8 00	— —
New England	"	"	— —	— —
Locust Mountain	W. A.	8 50	— —	— —
Honey Brook, L'h	W. A.		— —	— —
Spring Mountain	" "		— —	— —
Sugar Creek	" "		— —	— —
Sugar Loaf	" "		— —	— —
Old Comp'y's	" "		— —	— —
Cross Creek	" "		— —	— —
Room Run	" "		— —	— —
Girardville	" "		— —	— —
McMichael	" "		— —	— —
Shamokin	" "	7 25	— —	— —
Lykens Valley	" "	7 75	— —	— —
Broad Top	" "	6 25	— —	— —
Hill & Harris	" "	7 25	— —	— —
Henry Clay	" "		— —	— —
Powelton	"	6 25	— —	— —

[*Dealers in these coals may be found in our advertising columns.]

Company Coals.

June, 1871.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port	5 00	5 25	5 50	5 75	6 00	5 25
*Pittston at Newburgh	5 50	5 50	5 70	5 80	6 00	5 30
Lackawana at Rondout	5 20	5 20	5 50	5 75	6 00	5 20
Wilk'b're at Hoboken	5 00	5 00	5 40	5 75	6 00	5 25
Old Co. Lehigh at Pt. Johnston	6 75	6 00	6 00	6 00	6 50	5 50
Lehigh at E. Port	— —	— —	— —	— —	— —	— —

For freights to different points see "Freights."

* To contractors.

Prices at Baltimore—June, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$— @ —
Pittston and Plymouth, do	— @ —
Shamokin Red or White Ash, do	— @ —
Lykens Valley Red Ash, do	— @ —
Zerba Valley	— @ —
Treverton	— @ —
By retail, all kinds per ton of 2240 lbs.	— @ —
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75@4 95
Fairmont and Clarksburg gas, f. c. b. at L. Point	6 00@6 50

Prices at Georget'n, D.C., & Alexandria, Va.

June, 1871.

George's Creek and Cumberland f. o. b. for shipping..$4

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— @ —
Lykens Valley	— @ —
Shamokin Red or White Ash	— @ —
Trevorton and Zerba Valley	— @ —

Prices of Gas Coals.

June, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

Duty, $1 25, gold

	Coarse	Slack.
Block House	$1 75 @ 1 75	
Gowrie	1 75 @ 1 75	

Freights.—June, 1871.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philada'a.	Anthracite. From Port Carbon, Richmond and Bridesburg.	Anthracite. From Newbury...	Anthracite. From Rondout....
Amesbury			$2 50	$2 60		
Bangor	$2 75		2 90	1 75		
Bath	2 75	2 75	2 90	2 00		
Boston	2 50	2 50	2 25	1 75		2 00
Bridgeport	2 25	2 25	1 80	1 00		1 25
Bristol		2 60	2 00	1 25		1 55
Cambridgeport			2 75	2 00		
Derby			2 00	1 20		
Dighton	2 30	2 35	2 50	— —		
East Cambridge			2 35	2 00		
Fall River	2 25	2 25	2 25	1 50		
Hackensack			1 75	1 00		
Hartford	2 50		2 30	1 50		
Jersey City		2 00	1 40	1 50		
Middletown			2 25	1 25		
Mystic			— —	1 25		
New Bedford	2 30	2 35	2 00	1 25		
Newburyport	2 75		2 40	1 85		1 55
New Haven	2 25	2 25	1 90	1 00		2 20
New London	2 25	2 25	1 76	1 05		1 25
Newport			2 00	1 25		1 40
New York	2 00	2 00	1 35	50		65
Norwalk			1 80	1 00		
Norwich	2 50	2 25	2 00	1 10		
Pawtucket	2 50	2 40	2 30	1 75		1 50
Portland	2 50	2 60	2 30	1 75		1 65
Portsmouth, N.H	2 75	2 75	1 45	1 60		2 00
Providence	2 25	2 25	2 00	1 15		1 55
Rockport			2 10	1 65		
Saco	2 75		2 25	1 75		
Sag Harbor			1 70	1 20		
Salem	2 60	2 75	2 35	1 50		
Stamford			2 00	1 00		
Stonington			2 00	1 75		1 40
Taunton			2 30	1 75		
Warren			— —	1 40		
Washington			1 25			—
TO RIVER PORTS.						
Albany		80				55
Catskill		70				50
Cockaackie		70				50
Coeyman's		70				65
Cold Spring	2 20	70				30
Fishkill		70	1 60			30
Haverstraw						60
Hudson	2 20	2 25				40
New York						60
Nyack			1 75			30
Poughkeepsie						30
Rhinebeck						70
Rondout						75
Saugerties			1 60			40
Sing Sing						75
Stuyvesant						75
Tarrytown						75
Troy						65
West Point			1 75			
Yonkers						60

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@— 80
Lingan	1 60	@— 80
Little Glace Bay	1 60	@1 60
Caledonia	1 60	@— 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 10 @7 25
Fairmount Gas Coal Co. of N. Y.	7 50 @— —
Despard Coal Co	$7 50 @— —
Penn	7 75 @8 00
Newburg Orrel Gas	— — @— —
West Fairmount Gs Caoal	8 00 @— —

AT PHILADELPHIA.

Powelton $7 75

Prices of Foreign Coals.

June, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00@— —
" " Cannel	11 50@12 50
" House "	— —@16 00
" Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Foreign and Provincial Freights.

June, 1871.

Foreign.

Newcastle and Ports on Tyne, per kesl of 21 1-6 tons	£14 00@£16 00
Liverpool, 5 per cent primage	13s @15 ton.

TO NEW YORK.

Provincial

Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon	$1 85

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Manch Chunk to Easton	$0 98
C. R. R., N. J., Easton to Elizabethport	1 42
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 75

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton	$0 98
C. R. R., of N. J., Easton to Pt. Johnson	1 45
Shipping expenses	25
Warfage	10
Total	$2 78

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 98
Morris & Essex R. R. Easton to Hoboken	1 45
Shipping expenses	25
Warfage	10
Total	$2 78

TO SOUTH AMBOY.

L. V. R. &	98
B. & D. R. R.	1 40
Cam. & Am. R. R.	
Shipping Expenses	10
Wharfage	10
Total	$2 78

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	1 15
C. RR. of N. J. Easton to Elizabethport	12
Shipping expenses	25
Wharfage	10
Total	$ 2 72

METALS.

NEW YORK, June 2, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1¼ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3 cents ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, 8 per ton.

	Store Prices.
Pig, Scotch No. 1, ℔ ton	30 00@35 00
Pig, American, No. 1	34 00@36 00
Pig, American, No. 2	32 00@34 00
Pig, American, Forge	31 00@32 00
Bar Refined, Englishand American	74 00@75 00
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes	105 00@115 00
Bar, Refined, ord'y sizes	75 00@ 77 50
Bar, Refined, ¼ @ 5-16 inch	82 50@ 85 —
Bar, Common	— —@— —
Scroll	100 00@120 —
Ovals and half-round	95 00@105 00
Band	92 50@ 95 —
Horse Shoe	85 00@ — —
Rods, ⅜ to 3-16 inch	82 50@120 —
Hoop	100 00@140 00
Nail rod	— —@6¼ —
Sheet, Russia, as to assortment (gold)	11¼@— 12
Sheet, Single, D, and T. Common	4¼@— 6
Sheet, Galv'd, Nos. 14 to 26	12@14 and 30 ℔ ct. dis.
" " Nos. 27, 28, and 29	15@18 and 30 ℔ ct. dis.
Rails, English (gold), ℔ ton	56 00 @58 00
Rails, American, at Works in Pa	70 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	—	15	@— 18
English Spring (2d and 1st quality)	—	7	@— 19
English Blister (2d and 1st quality)	—	10	@— 17
English Machinery	—	11½	@— 14
English German (2d and 1st quality)	—	12	@— 14
American Blister "Black Diamond"	—	—	@— 12
American, Cast, Tool do.	—	16	@— 17
American, Spring, do.	—	9	@— 11
American Machinery, do.	—	—	@— 12
American German, do.	—	9	@— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.	
Copper, New Sheathing, ℔ lb	—	@— 30
Copper Bolts	—	@— 32
Copper Braziers, 16oz. and over	—	@— 32
Copper Nails	36	@— 38
Copper, Old Sheathing, &c. mixed lots	—	@— 19
Copper, old, for chemical purposes	20	@— 21
Copper, American Ingot	21¼	@— 21½
Yellow Metal, New Sheating & Bronze	—	@— 22
Yellow Metal Bolts	24	@— —
Yellow Metal Nails	—	@— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2½ cents ℔ lb.

Galena, ℔ 100 lbs	$—	@— —
Spanish (gold)	6 12½	@6 18
German, do.	6 12½	@6 18
English, do.	6 15	@6 50
Bar (net)	— —	@8 75
Pipe (net)	— —	@10 25
Sheet	— —	@10 25

Colwell, Shaw & Willard Tin-Lined Pipe 15 cts. ℔ lb.

SPELTER—Duty: In Pigs, Bars & Plates, $.150 p. 100 lb.

Plates, Foreign (gold) p. 100 lb.	$ 75	@ 6 —
Plate, Domestic p. lb.	— 7	@— 11

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	—@37½
Straits	—@32½
English	—@32

PLATES.

	Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$8 50 @8 75		$9 75 @10 00
I. C. Coke	7 25 @8 00		8 25 @ 9 25
Coke Terne	6 12½@7 12½		7 00 @ 8 25
Charcoal Terne	7 75 @8 50		9 00 @ 9 75

ZINC—Duty: Pig or Block, $1 50 ℔ 100 lb.; Sheet, 2½ cts. ℔ lb.

Sheet, No. 9 to 11 Foreign ℔ lb.— 8½@—

REMARKS.

IRON.—The market for Scotch Pig remains very quiet, there being no demand except for parcels to meet the immediate wants of consumers, and prices are irregular—we have only to note sales of 200 tons Eglinton, to arrive, at $30, and 200 do. Gartsherrie, $32. The demand for American has been rather moderate, but as there are very few parcels obtainable, prices are supported—we quote No. 1 $34@$36, and No. 2 $32@$34. There has been very little inquiry for either new or old Rails, but prices are unchanged—we quote English new $55@$5, gold, and American $70@$72, currency, at the works in Pennsylvania. Refined Bar is without change—the Trade are looking with much interest to the result of the meeting of makers to be held to-morrow, 1st June, when the new schedule will be acted upon. We note a sale of 40 tons corrugated galvanized Sheet at 30 per cent. discount from the List.

LEAD.—The demand for Pig is very light, and we have but to notice the sale of 25 tons Spanish at $6 15, gold. Bar, 8¼c.; Sheet and Pipe, 10¼c., cash, less 10 per cent. to the Trade; and Tin-lined Pipe, 15c. less 2 cents to the Trade.

COPPER.—The manufactures of Copper and Yellow Metal are steady at our quotations. Buyers of Ingot confine their purchases to small lots, as free receipts of Lake are expected within a fortnight; the sales embrace 140@150,000 lb.; Detroit and Lake Superior at 21½@21¾c., cash.

TIN.—Buyers of Pig still hold aloof, and the market has seldom been as quiet as it has been the past month; the only sale is 75 slabs Straits at 32½c. We quote nominally Straits, 32½c.; English, 32c.; and Banca, 37¼c., all gold. The market for Plates, though not active, has a more healthy tone, consequent upon stronger prices in England. Sales have been made of 750 bxs. Assorted Charcoal Tin at $8 37½ for I. C.; 200 do., $8 56 for I. C.; 500 do. Coke Tin, 10 by 14, $7 62½, all gold; and 200 do. Charcoal Terne, on private terms.

SPELTER.—The demand for foreign is very limited, and prices are without improvement. We have only to notice the sale of 10 tons at 5½c., gold.

STEEL continues without any alterations from previous quotations.

ZINC.—The demand is moderate and holders firm. Sheet, foreign, is quoted at 8¼c., gold; Manganese, black crude, is quoted at 3¼c.; Pyrolusite, 5½c.; and do. lump, 4¼c., all currency.

Mining Stocks.

NEW YORK, June 2, 1871.

Petroleum stocks have decidedly advanced, compared with our last report; 1,000 shares of Central changed hands this morning at 67½, and 1,000 at 67. Below is the full report of the Mining stock board:

PETROLEUM STOCKS.

	BID.	ASKED.
Bergen Coal and Oil	20	—
Bennehoff Run	25	35
Blood Farm	—	60
Brevoort	—	—
Bliven Oil	—	50
Buchanan Farm	40	45
Central	67	75
Clinton	—	—
Home	160	—
Phillips Pet	—	—
Rynd Farm	35	—
United Petroleum Farms	—	—
United States	60	70
National	10	—
New York & Allegheny	60	—
Northern Light	25	—
Pithole Creek	60	—
Rathbone Oil	21	—
Second National	—	50
Sherman & B	—	—
Tarr Farm	—	—

GOLD STOCKS.

Gold stocks are firmer; sales of 1,000 La Crosse were affected this A.M., at 20; and 200 Smith & Parmelee at 40. The following is the report in full. In miscellaneous stocks, Hilton Copper is quoted at 75, and Minnesota ditto at 2.

	BID.	ASKED.
American Flag	17	—
Bates & Baxter	30	—
Benton	01	—
Black Hawk	—	30
Central Gold	9	10
Cons Gregory	45	50
Grass Valley	14	16
Gunnell	17	—
La Grosse	18	22
Liberty	1	3
Mariposa prf	—	—
Montana	3	—
Rocky Mount	4	—
Quartz Hill	—	—
Smith & Parmlee	35	—
N. Y. & Eldorado	—	—

San Francisco Stock Market.

The following is a report of quotations of the San Francisco Mining Stock Board, "per telegraph" dated California, May 30th. All stocks on the list have declined, with the exception of Yellow Jacket, Kentuck, and Crown Point, which have advanced $3, $16.50 and $11 per share respectively.

Savage	48
Yellow Jacket	75½
Kentuck	108
Chollar Potosi	49½
Gould & Curry	82
Belcher	132
Imperial	38
Amador	200
Crown Point	279
Hale & Norcross	—

The Slate Trade.

NEW YORK, May 27, 1871.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE IN NEW YORK.

Vermont purple, 1st quality, per square	$6 50@ 7 00
" green, 1st " "	6 50@ 7 00
" red, 1st " "	15 00@16 00
" variegated, " "	5 75@ 6 20
d. b'k and d'k blue, 1st qual., "	6 00@ 7 05

VERMONT SLATE TRADE.

REPORT of Slate Shipped from Middle Granville, N. Y., via the R. & S. R. R., for the week ending May 27, and for the year 1871.

ROOFING SLATE.

NO. OF SQUARES.	Week.	Prev'ly.	Year.
†Penrhyn Slate Co	356	1,275	1631
New York } *and Middle Granville Slate Co }	85	1,470	1555
†American Slate Co	....	....	....
Benj. Williams	130	445	575
Jones & Williams	40	20	60
Eagle Slate Co	....	60	60
Mettowee Slate Co	....	265	265
Albany Slate Co	....	245	245
H. W. Hughes	....	30	30
Total	....	....	—

MILL STOCK, MANTLES, &C.

NO. OF CASES SHIPPED BY	Week.	Prev'ly.	Total
Eagle Slate Co cars	....	....	....
Penrhyn Slate Co "	133	1,545	1,683

BLACK BOARDS.

NO. OF CASES.	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	....	....	....

MILL STOCK, &C.

NO. OF CARS SHIPPED BY,	WEEK.	PREVIOUSLY.	YEAR.
Eagle Slate Co cars.	1	12	13
Penrhyn Slate Co	....	....	....

* Sales made together this season.

† Consolidated Sales.

PENNSYLVANIA SLATE TRADE.

The following is a weekly statement of Roofing Slates, School Slates and Mantels, shipped from Slatington, via Lehigh Valley Railroad for last week, ending May 27, 1871.

ROOFING SLATE.

Jones & Williams	210	squares.
Locke Slate Co	175	"
D. Williams & Co	—	"
Columbia Slate Co	70	"
Jones & Town	—	"
H. Williams	210	"
J. Anthony	35	"
Thomas & Bros	—	"
Keystone Slate Co	—	"
Enterprise Slate Co	—	"
W. F. Fagely	—	"
Lehigh Slate Co	105	"
H. J. Hankee	18	"
W. Hughes	—	"
F. J. Settler	—	"
Saylor & Morgan	70	"
American Slate Co	105	"
Kuntz & Woodring	—	"

SCHOOL SLATE.

D. Williams	9	cases.
A. W. Lerch	50	"
Lock Slate Co	34	"
Lehigh Slate Co	9	"

MANTLES.

Lehigh Slate Co	30	"

BLACK BOARDS.

Lehigh Slate Co	3	"

BY THE L. S. RAILROAD.

ROOFING SLATE.

Heimbach Slate Co	105	squares.
Twin City Slate Co	35	"

MANTELS.

Heimbach Slate Co	4	cases.

FROM TREICHLER'S STATION.

Eagle Slate Co	175	squares.
Continental Slate Co	230	"
Thomas Beck & Co	105	"
W. Parry	105	"

SCHOOL SLATES.

A. W. Lerch	167	cases

Estimation of Sulphur in Cast-Iron.

DR. L. DE KONINCK, C.E., in an essay on this subject, reviews first the various methods applied and generally known for the estimation of sulphur in cast-iron; next, he gives a detailed description, illustrated by engravings, of two new methods tried by the author and M. DIETZ. The principle of the first of these methods is based upon the formation of sulphuretted hydrogen from cast-iron, when treated with dilute hydrochloric acid, and the passing of that gas into a neutral solution of nitrate of silver, and the formation of sulphide of silver, which, being separated by filtration, is treated with bromine in the presence of water, when the following reaction takes place:

$$Ag_2S + 8Br + 4H_2O = 2AgBr + 6HBr + H_2SO_4.$$

Since bromide of silver is insoluble, the estimation of the sulphuric acid, after separation of the insoluble bromide, presents no difficulty. The reader should understand that the authors have devised a properly-arranged apparatus for the execution of this process. The other process is based also upon the evolution of sulphuretted hydrogen from the iron, and the passing of the gas into a neutral solution of sulphate or chloride of cadmium; the result is the formation of sulphide of cadmium, and the setting free of a quantity of acid equivalent to the quantity of the salt converted into sulphide, which free acid is, after the separation of the sulphide by filtration, estimated by means of a titrated solution of ammonia or of caustic potassa.—*Chem. News.*

Capacity of Furnaces.

For the combustion of 1 lb. of bituminous coal, 150.35 cubic feet of atmospheric air is required to be admitted through the grate of a furnace. The combined volume of the atmospheric air and gases resulting from combustion, at the bridge wall, flues, or tubes, is 154.81 cubic feet, the temperature being assumed equal to that of the air at the ash-pit—about 100 degrees. As the heat of an ordinary furnace, however, may be estimated at 1,000 degrees, the volume of the combined air and gases is increased by the law of expansion in the ratio of 1 to 2.8783, raising it from 154.81 to 445.59 cubic feet. Finally, as an amount of oxygen equal to that required for the combustion of the coal passes off uncombined, the total volume to which the area of the bridge wall, or the flues and tubes, must be proportioned is 891.18 cubic feet. The velocity with which the gases pass from the furnace, if the boiler is properly proportioned, is from 30 to 36 feet per second. An area of .99 of a square inch at the bridge wall is, therefore, required, as shown by a brief mathematical calculation, for each pound of coal consumed per hour. This is the minimum limit, it should be remembered; and if less area than this is given at the bridge wall, or to the flues or tubes, defective combustion will be the certain result. In practice it is advisable to increase this proportion of area to amount of coal consumed, if circumstances will allow, sufficiently to leave an ample margin for the variable conditions to which every furnace is liable in its practical operation.

For the combustion of 1 lb. of anthracite coal the amount of atmospheric air required is 195.45 cubic feet—about 30 per cent. more than for bituminous coal. For the combustion of 1 lb. of coke, only about 108 cubic feet of air is required, or nearly 30 per cent. less than for bituminous coal.

Receptacle for Sulphuric Acid.

MR. R. H. DAVIS has patented a new sulphuric acid receptacle in England. He lines any ordinary cask or barrel with lead, and burns or solders the seams with an ordinary burning machine, such as is used by chemical plumbers; or he makes a cast leaden vessel, suited to the shape of the outer wooden covering, so that the leaden vessel may be placed therein, and be thereby protected from injury. When the sulphuric acid has been introduced into the lead-lined cask, or cast-leaden vessel, the inventor closes up the vessel by burning or soldering upon the head a capping of lead, with or without a screwed capsule of incorrodible metal.

Metal Cement.

THE difficulty of uniting iron to brass is created by the unequal rate of expansion in the two metals, which destroys the unity when the temperature is changed. A new alloy of copper is announced, and the inventor claims that its expansion by heat is so similar to that of iron and steel that the surfaces may be regarded, when joined, as permanently united for all practical purposes. The formula recently published in the *Journal of Applied Sciences* is as follows: Tin, 3 parts; copper, 39½ parts; zinc, 7½ parts.

Railroads in Germany, Etc.

The associated railways of Germany on January 1, 1871, consisted of 78 companies, owning 19,145 miles of road against 17,178 miles on January 1, 1870. Of these companies, 49, owning 11,835 miles of road, were in Germany; 24, owning 5,960 miles, were in Austria and Hungary; and five, owning 1,350 miles, were in Holland. During 1870 the German lines had built 884 miles of road, the Austro-Hungarian, 1,013 miles, and the Dutch 70 miles—making a total of 1,967 miles.

THE first cargo of anthracite coal ever received at San Francisco, from an American port, was landed from the barkentine Lulu, from Queen Charlotte Island, Feb. 16. The Colonial Government of British Columbia had offered $2,500 premium for the first cargo exported that resembles Lackawanna.

Mallet's Method for Producing Oxygen.

THIS method is based on the property of sub-chloride of copper for absorbing oxygen when in contact withair, and releasing it again when heated to 400 degrees Celsius. Dr. JOS. PHILIPPS, the inventor of a method of illumination by burning the so-called carboline in oxygen, gives in his late pamphlet, "*Oxygen, its occurrence, manufacture and use for illuminating purposes, etc.,*" a description of MALLET'S process, the main features of which are the following :

The sub-chloride of copper as used for this process, can be made economically by treating copper-turnings, old sheet copper or copper scales with hydrochloric acid with access of air. Sheet copper and turnings are preferable, because the scales often contain impurities. But if the latter are used, the process goes on quicker and access of air is not necessary. Whatever material is employed is put into deep pots, and sufficient fuming hydrochloric acid is added to moisten the copper thoroughly. From time to time this is repeated, and the pots are placed into a warm place, in summer into the sunshine. After two or three weeks the copper-turnings, if such have been employed, have disappeared and the pots contain a heavy, dark-brownish green liquid, which, after evaporation in a porcelain vessel, leaves an emerald-green, crystalline mass of chloride of copper. One kilogramme of copper-turnings furnishes three kilog-ammes of the above chloride. If this be strongly heated, water is first eliminated ; on increasing the temperature one part chlorine is freed, and a dark-brown mass of anhydrous sub-chloride of copper is obtained. If this is brought in contact with moist air, or moistened by water, it becomes first white by taking up water ; after two or three hours it turns entirely green, by changing into oxychloride of copper, having absorbed oxygen from the air. The following formula expresses this :

$$[Cu_2\,Cl + HO + O = Cu\,Cl + CuO + HO.$$

It needs further investigation to determine, whether the combination formed is accurately expressed by the above formula ; it is probable that still more basic combinations are formed besides.

If the oxychloride of copper is now again heated, it first gives up water, and at about 400 degrees the oxygen is set free, while the sub-chloride of copper remains, according to the formula :

$$Cu\,Cl + CuO + HO = Cu_2\,Cl + HO + O.$$

This absorption and release of oxygen under the above conditions can be repeated *ad libitum*. If the oxychloride of copper is treated with hydrochloric acid, chloride of copper is formed, which, when heated, first emits chlorine.

Prof. M. LAURENS, of Rouen, has based on this behavior of chloride of copper a method for the production of chlorine, which was carried out on a large scale by MALLET in a rotating apparatus constructed for that purpose, and which he extended, using the same apparatus and mass, for the production of oxygen.

Dr. PHILIPPS has tried Mallet's method to produce oxygen, using an apparatus, which, planned by Mallet, was constructed in a machine-shop at Cologne, and is now actively used for the production of oxygen. This apparatus consists of an iron furnace, which is 0·95 meters high and wide, and 0·75 meters deep. It is covered by a cast-iron plate, which contains four square openings for the reception of the retorts. The interior is lined with chamotte. The flues are on the sides opposite each other, run half around the furnace under the plate, and join each other, entering the chimney. The cast-iron retorts are 0.72 meters high, above 0·18 meters square, and taper downwards to 0·15 meters. In the bottom of the retorts a cast-iron ring is fastened, so that the retorts can be lifted and turned over with an iron hook whenever the contents are to be removed. The retorts are furnished with covers catching over their rim, around which clay is smeared to close the interstices. By means of a stirrup and screws the covers are closely held in place. On one side of the cover is a hole, in which a pipe 0·10 meters high is fastened. It is wide enough to permit the introduction of a lead-pipe, and the opening around it is closely packed with clay. The retorts and cover are both well enamelled inside. MALLET recommends to line the retorts of a larger apparatus with chamotte, and to treat this with a solution of water-glass and magnesia.

The retorts are hung into the fire in a somewhat inclined position. The lead-pipes from the retorts enter a washing apparatus, curved somewhat similar to that in which illuminating gas is washed. In the washing apparatus there is water, into which the bent pipes are inserted, thus closing them against each other. In this apparatus the water, coming from the mass on first heating as steam, is also condensed, and an excess of it leaves the vessel by a pipe near the top. It is used again after the operation, for the moistening of the mass. The closing of the washing apparatus against the outside is also accomplished by water, which must be renewed from time to time on account of evaporation. From the washing apparatus a pipe leads the oxygen into a gasometer. The washing apparatus rests on two pillars, which are fastened to the plate on top of the furnace.

The mass used by Dr. PHILIPPS for the filling of the retorts consists of 50 kilogrammes of chloride of copper, mixed with 33⅓ per cent. of kaoline, in order to avoid baking of the mass. By a first slow and then increased fire, the chlorine is expelled, and hereby the mass capable of the following absorption of oxygen is produced. To save the chlorine, it can be conducted through moist copper-turnings, which absorb it, and chloride of copper is formed. After the chlorine is expelled, the retorts are left a short time to cool ; they are then lifted from the fire by blocks and tackles, a hook is introduced into the ring at the bottom, and they are turned over to empty them of their contents. The brown mass is moistened with water, and after two or three hours it turns green, by absorbing oxygen from the air. This mass releases now oxygen, as above mentioned, as often as it is heated ; and with access of the air and moisture, it absorbs oxygen again. It is best to let the regeneration of the mass go on in the retorts, thus preventing all losses. The 50 kilogrammes of chloride of copper, which were first put into the retort, yield, after the chlorine has been expelled and oxygen absorbed, 1.5 cubic meters of oxygen at every heating, if the operation is properly conducted.

In Dr. PHILIPPS' laboratory is a mass which has served for two hundred operations, and is now as good as ever. It must of course be avoided to bring the mass in contact with iron, as the chloride of copper is thereby decomposed. The supervision of the apparatus is very simple, as only the fire has to be watched. When oxygen is produced by this method on a large scale, for which purpose MALLET has constructed horizontal, rotating retorts, a loss is as little to be feared as in the above-described experiments, as the mass remains in the retorts. MALLET effects the regeneration in the retorts by means of steam, when the mass under access of air takes up oxygen from it at once at about 200 degrees Celcius.

Report on Lackawana, Pittston and Cumberland Coal,

Made by Capt. I. ARNOLD, Jr., at U. S. Armory, Springfield, Massachusetts.

NATIONAL ARMORY, January 31, 1871.

MAJOR J. G. BENTON, Commanding:

SIR—In accordance with your instructions, I have the honor to report that I have applied the steam indicator to the low-pressure engine at the Armory, for the purpose of finding the number of pounds of coal consumed per horse-power, per hour, for each of three kinds of coal, viz., Lackawanna, Pittston and Cumberland. For this purpose each kind of coal was used for six consecutive days ; three observations were taken with the indicator each day at 10 o'clock, A. M., the mean of these being taken as the indicated horse-power of the engine at that time. The following tables show the result for each kind of coal :

LACKAWANNA COAL.

Date. 1871.	No. of Hours Engine Run.	Amt. of Coal consumed.	Indicated Power.	No. of lbs. of Coal per horse power, per hour
January 2	8	2700 lbs.	97.87	
January 3	8	3400 lbs.	97.63	
January 4	8	2840 lbs.	99.59	
January 5	8	3150 lbs.	93.10	
January 6	8	3336 lbs.	89.19	
January 7	8	2990 lbs.	95.07	
	48	18416 lbs.	572,45	4.01 lbs.

PITTSTON COAL.

Date. 1871.	No. of Hours Engine Run.	Amt. of Coal consumed.	Indicated Power.	No. of lbs. of Coal per horse power, per hour
Jan'y 9	8	3060 lbs.	103 44	
Jan'y 10	8	3075 lbs.	108.33	
Jan'y 11	12	4446 lbs.	105.50	
Jan'y 12	8	3225 lbs	90.83	
Jan'y 13	8	3245 lbs.	86.36	
Jan'y 14	8	3366 lbs.	91.61	
	52	20435 lbs.	586.07	4.02 lbs.

CUMBENLAND COAL.

Date. 1871.	No. of Hours Engine Run.	Am't of Coal consumed.	Indicated Power.	No. of lbs. of Coal per horse power, per hour
Jan'y 23	8	2895 lbs.	109.81	
Jan'y 24	8	2685 lbs.	107.36	
Jan'y 25	8	3130 lbs.	104 75	
Jan'y 26	8	2710 lbs.	107.30	
Jan'y 27	8	2515 lbs.	97.65	
	40	13935 lbs.	526.87	3.3 lbs.

COST OF COAL.

Lackawanna	$8 20 per ton of 2240 lbs.	—$0.00366 per lb.	
Pittston	7 85	" " "	0.00350 "
Cumberland	9 10	" " "	0.00406 "

COST OF COAL PER HORSE POWER, PER HOUR.

Lacka Wanna	$0.01464
Pittston	0.01400
Cumberland	0.013398

Respectfully submitted, I. ARNOLD, Jr.,
Capt. Ord. U. S. A.

The Iron Industry of Missouri.

THE following item from a St. Louis cotemporary shows the great activity in iron manufacture in the State of Missouri : "The coming season, the Vulcan Iron Works Company contemplate the erection of a furnace on an entirely new principle, and which will be larger than any now in use in America. The new furnace will stand on twelve columns, each thirteen feet high—will be twenty-five feet interior diameter, or bosh, and one hundred feet high. It will have five times the cubical area of any furnace now in Carondelet. The blast will be propelled by two powerful engines, the same size of the one above described as being in course of construction. Her hot-blast will be entirely of fire-brick, encased in wrought iron, and therefore almost indestructible. The temperature of heat thus gained will range *from fourteen hundred to sixteen hundred degrees*, and higher, if desired ; whereas the heat of furnaces at present, in cast iron pipes, cannot in safety exceed 850 degrees. This great increase of heat, forced into the furnace, with such a powerful volume of blast, will economise the fuel—resulting in a saving of from forty to fifty per cent., and at the same time maintaining a much higher temperature of heat in the furnace, will produce a higher percentage of iron from the ores ; and by the same course of reasoning will reduce the percentage of limestone flux—thus resulting in a saving of the three elements required in the production of iron, and from thirty to fifty per cent. in labor ; because, this furnace is expected to produce from 180 to 200 tons of iron per day. One of the most serious drawbacks in the management of furnaces, is the loss by stoppages. Being double-rigged throughout, delay and serious loss from this cause will be obviated. This furnace, when completed, will surpass anything in the furnace line in this country or in England ; and the practical result of the bold stroke being made by this progressive company will be watched with great interest by iron manufacturers everywhere. We are indebted to the accomplished superintendent of the furnaces, J. P. WITHROW, Esq., for the foregoing outline description of this new furnace, and shall keep our readers advised as to the progress of the work. Having already given in these columns the dimensions, character, etc., of the new buildings which comprise the Vulcan Iron Works, which are rapidly approaching completion, and which, when completed, will be fully described, we will here give merely notes of progress. The company have a small army of men at work, embracing in all, we believe, about seven hundred hands ; and as we have visited the works at intervals of two or three weeks, we are satisfied no work of the magnitude has been carried forward with better system and order—more successfully in every respect than these—all under the general direction of that master-mind, DANIEL R. GARRISON, President of the company, to whom, as a practical engineer, the company are indebted not only for the conception but the execution of the plans in general and in detail. Thirteen vertical engines of various sizes will be employed, and most of them are already in place, each propelling a distinct piece of machinery. A main steam-pipe of wrought iron (twelve inches interior diameter) extends the whole length of the mill, and serves as a steam reservoir, with which all the engines are connected by independent steam-pipes, and from this reservoir draw their supply, so that the pressure is equal, and can be graduated at each engine as required. There are twenty double puddling furnaces, equivalent to forty single furnaces, and over each double furnace is a boiler heated by the waste gases, after they have filled their mission in reverberatory furnaces, thus utilizing the heat, which, if made expressly for heating the boilers, would cost from $200 to $300 per day. Each of these twenty boilers are connected (overhead) by steam pipes, with the main steam reservoir above alluded to, thus equalizing the power for all parts of the mill. The three large driving wheels are propelled by three vertical engines, each about 150 horse-power, approximately."

Anthracite Coal Trade of Pennsylvania.

Mr. PETER W. SHEAFER, a well-known engineer at Pottsville, Pa., has prepared a diagram exhibiting the progressive development of the Anthracite Coal Trade of Pennsylvania. It embraces the period of fifty years from 1820 to 1870, and an accompanying table gives in detail for each year, the yield of anthracite of the four great subdivisions of the anthracite region, the Lehigh, the Schuylkill, the Wyoming, and the Lykens Valley, Shamokin, etc. We take the export in tons, for the years below specified, from the table :

	Lehigh.	Schuylkill.	Wyoming.	Lykens V., etc.	Total.
1820....	365				365
1830....	41,750	89,934	43,000		174,734
1840....	275,313	475,091	148,470	15,505	864,384
1850....	690,456	1,782,936	827,823	57,684	3,358 899
1860....	1,821,674	3,270.516	2.941,817	479,116	8,513,123
1870....	3,172,916	3,853,016	7,825,128	998,839	15,849,899

The Schuylkill trade began in 1822, with the exportation of 1480 tons ; the Wyoming, now twice the largest, in 1829, with 7000 tons ; the Lykens Valley, etc., in 1839, with 11,930 tons. —*American Journal of Science and Arts, May*, 1871.

Velocity of Flowing Water.

THE mean or average velocity of a flowing stream is found by scientific experiments to be from .81 to .83 of the maximum velocity, or that in the line of the current. At half depth of the stream the velocity is .915, and at the bottom .83, of that at the surface. The average depth of flowing water is found by setting off the breadth of the stream into any convenient number of divisions, ascertaining the depth of each, and adding these depths together ; their sum being then divided by the number of divisions of the stream, the quotient will be the average depth. The area of the stream is of course obtained by simply multiplying the mean depth by the breadth. To obtain the volume of flowing water, multiply the area of the stream by the velocity of the flow infeet ; the product will be the volume in cubic feet. The velocity of water in a canal should be proportioned to the character of the bed. To prevent the deposit of slime and growth of grass, a velocity of about eight inches per second is requisite, and the mean velocity, over a slimy bed, should not exceed this limit. Over common clay it should not be more than six inches per second ; over sand or small gravel, one foot ; and on shingle or stony bottom it may range from three to six feet per second.

The energetic discussion which has arisen among the English engineers, on the question, if the strength of iron is diminished by cold, has induced us to compare the reports published by the railway directors on the breaking of beams (axles) on German railways from 1863 to 1869. The following table shows how these cases were distributed over the different seasons :—

	DECEMBER. FEBRUARY.	MARCH. MAY.	JUNE. AUGUST.	SEPT. NOV.	NUMBER OF BREAKINGS.
	Per cent.	Per cent.	Per cent.	Per cent.	
1863....	31.9	24.4	21.5	22.2	135
1864....	39.0	18.2	22.1	20.7	154
1865....	29.4	23.6	24.8	22.2	153
1866....	26.0	17.9	25.4	30.7	169
1867...	28.0	22.9	16.8	32.3	214
1868....	33.8	24.1	26 0	18.1	204
1869....	22.7	28.8	22.1	26.4	163
Average	30.1	22.6	22.7	24.6	

" for September-February.....54.7 per cent.
" for March-August.....45.3 "

According to the above, it appears that breakings of beams occur more frequently in winter than in any other season.

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The Catastrophe at Pittston.

OUR mining summary contains the particulars of the recent burning of a coal-breaker at Pittston, Pa., with consequent loss of human life. The press has been very severe upon the operators; and, in many cases, the criticisms of newspaper writers have betrayed great ignorance. One New York daily distinguished itself by attacking BLAKE & Co., because they had "a wooden shaft" instead of an iron one, as though a burning building could not drop into an iron-lined shaft. The fact that more men were in the mine than the law allows to a single shaft, is, of course, a proper text for blame; though, if only twenty men had been underground when the fire occurred, there is no reason to suppose they would have reached the car in time to get out.

The fact is, that for years these mines with single shafts were worked in Pennsylvania without comment, except from a few croaking engineers, whose warnings were unheeded. The Avondale horror roused the Legislature to sudden action, and a law was passed, the provisions of which were hasty and not in all localities equally practicable. The provision of that law requiring second shafts to be completed within a certain period has been considerably interfered with by the strike, which in many cases extended to all "dead work;" and the provision forbidding the employment of more than a certain number of men has been practically a dead letter in many instances, because of the eagerness of the workmen themselves, who do not like to lose employment on account of a risk which is no greater now than it was before the passage of the law. Meanwhile, all the operators are exerting themselves to comply with the law in regard to an extra shaft, though doubtless many of them have allowed their men to work as usual while the new shaft was sinking. The Inspectors are elected by the influence of the miners' union, and understand how much suffering among their constituents would be the result of too strict an enforcement of the law.

It seems strange to us that neither the law nor public opinion has attacked the real and greatest source of peril, namely, the erection of breakers, steam-boilers, coal-dumps, and powder-magazines directly over the shaft-mouth. So long as this continues, the mines will not be safe. The breakers are huge, slight, combustible structures; and, in our opinion, great nuisances, as well as traps of danger. They absorb vast capital, and they directly waste an enormous amount of coal; but the whims of consumers, who must have their coal broken, and sized, and cleaned ("almost," as an operator remarked at the recent meeting of American Mining Engineers, "put up in tin foil") necessitate still these cumbrous and expensive contrivances. But there is no need of putting them right over the shafts, nor for including the steam machinery under the same roof. Some engineers (*e. g.*, Mr. FREDERICK MERCUR) have erected breakers to which the power is transmitted from a separate building. And in all cases, by a simple arrangement, the shaft-mouth might be outside of the building altogether, as is the case with slopes.

Again, the shaft-mouth could be provided with iron doors, opening to let the cage pass, and closing again to prevent anything from falling in. The openings of the up-cast and down-cast for ventilation could be led aside to the surface, at a little distance, when the breaker is over the shaft and such doors are employed.

We have no desire to exculpate anybody in the present case; but we would point out that all parties, miners, operators, and consumers together, are guilty as to the causes of the present reckless, wasteful, and dangerous system of mining anthracite coal.

The painful scenes enacted at Pittston gave new testimony to the nobility of human nature, by their numerous illustrations of noble devotion and self-sacrifice. We take from the Scranton *Republican* a few instances, regretting that so many more have escaped the recording pen. Registered they are, no doubt, on a brighter and more enduring page than ours.

MARTIN CRANE, a driver boy twelve years of age, was on the car, just as it started for the last time from the bottom of the shaft, but jumped off and ran up the gangway to give warning to some of the workmen. He reached a door, which the men had already closed and secured from the other side; and at this point, beyond which he was unable to proceed, his body was afterwards found. The young hero had given his life, a noble sacrifice, in vain.

JAMES MCDERMOTT, the engineer, stood at his post in the burning breaker, and three times lowered and hoisted the car. The fourth time, the wire rope, which was white hot, parted; and as nothing more could be done, the devoted engineer made his escape, with hair singed and boots scorched and terribly burned on the arms.

JOHN MCGOWAN carried five kegs of powder from the magazine, close by the flames, to a place of safety.

WILLIAM LAW, head boss of the Pennsylvania Coal Company, descended a short distance into the shaft, by means of a rope tied to his thigh, and examined the brattice.

DANIEL BYNON, W. W. KENRICK and BARNARD MULROY descended a still further distance, clearing away burned and burning timber, and remained three-quarters of an hour in this perilous position.

Mr. CROOKS and two others (names not given) subsequently descended to the bottom of the shaft; and after them went in relays a host of volunteers, to find and bring out the dying and dead. The *Republican* says: "It was impossible to ascertain the names of all these fearless men, as more than a hundred responded to the calls made at different times. Some of these men after being in the mine a short time were brought up entirely exhausted, and required the aid of the physicians to revive them. We cannot find language to express the praise due these men for their bravery in facing death to rescue the dead and rapidly expiring victims in the pit. Some of these men descended again and again, until they finally tottered away completely overcome by exertion and the deadly gases. PHILIP JONES, one of the volunteers, was so overcome that he is not expected to live. He lost his father, a brother, and another relative at Avondale."

Our pride that such heroic deeds are in this nineteenth century still possible, is only equalled by our shame and sorrow that they should be necessary. Shall men continue to be so fearless in facing danger and so impotent in preventing it?

The Relative Value of Anthracite and Bituminous Coal for Steam Purposes.

CAPTAIN J. ARNOLD, Jr., reports concerning the recent trials of bituminous coals at the Springfield (Mass.) U. S. Armory, that three kinds of coal were tested, viz., Lackawanna, Pittston, and Cumberland, the first two being anthracite, and the last bituminous. Each kind of coal was used for six days, and three readings from the indicator taken each day. The mean of the three furnished the indicated horse-power of the engine.

Of Lackawanna coal, in six days, of eight hours each, there were consumed 18,416 lbs., giving an indicated horse-power of 572.45, or 4.01 lbs. per horse-power per hour. With Pittston coal the result was almost identical, 4.02 lbs. of coal per horse-power per hour being consumed.

Of Cumberland coal, in forty-hours, there were consumed 13,935 lbs., giving 526.87 indicated horse-power, or 3.3 lbs. of coal per horse-power per hour.

Estimating the cost of the coals at—Lackawanna $8 20, Pittston $7 85, Cumberland $9 10—the cost of coal per horse-power per hour would be respectively for these kinds $1 46, $1 04, and $1 33.

These accurate trials confirm the opinion we have frequently expressed as to the superior value, for the generation of steam, of Cumberland coals. If the prolonged strike in the anthracite regions shall have called the attention of manufacturers and engineers to this important fact, the inconvenience inflicted on the community will not have been in vain.

Weighty Words.

THE reply of Mr. PETER COOPER to the congratulatory address of the students and graduates of the Cooper Union is published at length in another column. From many points of view it is remarkable. The career of which it is in a certain sense the culmination has few parallels in society. Others than PETER COOPER have carved their way to fortune; many men of wealth have found, like him, the happiness that lies in its benevolent administration; but we know of no other instance in which the scheme of a far-reaching organized philanthropy has been conceived in youth and poverty, and patiently, unswervingly followed through more than half a century of laborious endeavor.

Mr. COOPER determined to build an institution for the intellectual benefit of workingmen when he was himself a common workman. He selected as the proper locality the very spot where his noble building now stands, though at that time there was no city to speak of above Chambers street, and the present busy neighborhood of the Cooper Union was merely a rural spot on the old Bowery road, and he was not its owner. For forty years he was engaged in buying from time to time, as his means permitted, and the lots were offered for sale, the ground required. Of course prices increased as the city grew, and his last purchases were made at exorbitant figures. He was an old man when he began at last to realize the dream of his youth; and now he has attended the twelfth annual commencement of the institution which, in the words of the graduates' address, "long years ago rose before his vision in distant and shadowy outline." Such perseverance as this is often shown in the service of selfish ambition, seldom for the sake of pure and wise benevolence.

But we do not mean at present merely to praise Mr. COOPER, nor the unique and admirable institution which he has founded. Our object is to call attention to the weighty words of his recent address.

Here is a man who has achieved success. He has not stumbled upon it; nor bought it by the sacrifice of honor; nor succeeded in one line after failing in another. He began with definite aims; and those very aims he has attained. Rich, and worthy to be rich, honored of Heaven and of men, he stands in the midst of us, and tells us in his simple, affectionate and earnest way, what are the secrets of success and happiness. He points out the road to wealth and the way to be happy in the use of wealth. The duties of the poor and the rich are alike indicated with honesty and kindness.

We frequently hear talk of virtue, industry and temperance as the means of success; and charity sermons (from impecunious preachers) are not uncommon; but people are apt to distrust the knowledge or the sincerity of those who volunteer advice. What PETER COOPER says, many have said; but from his lips trite words take fresh meaning; for all men must acknowledge that PETER COOPER has practiced what he preaches, that he knows what he affirms, and that he is thoroughly in earnest.

These are golden words: "Reform, to be of any permanent value, must be based upon personal virtue, not force; and it seems to me that the millenium will not be far off, when each individual shall set about reforming himself rather than society, and conforming his life to the just law of loving God and his fellow men."

With pathetic eloquence, he calls this "a kind of last will and testament of the garnered experience of an old friend." It is indeed a precious legacy; and all the more so, since, like the munificent material gifts of the same hand, it is received from the living benefactor, whom may Heaven long preserve to witness the fair fruits of his own generous labors, wise counsels and pure example!

New Publications.

THE GOLD YIELD OF NOVA SCOTIA from 1860–1870., by A. HEATHERINGTON. *Compiled from corrected official records. Sixth Year—Thirtieth Thousand. London: Trübner and Co., 60 Paternoster Row, E. C.* 1871.

The author has put into small compass and convenient form much reliable information concerning the yield of the Nova Scotia mines. In a large table in the front of the pamphlet he gives the production of each district for each year from 1862 to 1870, both inclusive; the sources from which it was derived (quartz or placer); the average yield per ton in each district and year; the annual average per hand; the aggregate number of days' work done in the several districts and years; the average number of men employed during each year of 312 days; the total weight of quartz raised and crushed, and daily average per hand; the number of mills and the motive power employed, and finally the number of mines worked in each district during each of the nine years included in the table. This large table is followed by two tables of a more general character, the first arranged according to the years and giving the total production of all districts for each year and the grand total for the entire time, which amounts to £805,200, or about $4,026,000. The second general table gives the yield per year of each district.

In summing up this admirable statement, the author says: "If the claim of Nova Scotia to be considered a permanent gold-producing country rested merely upon one year's results from a single mine, or upon the dicta of a few theorists or interested agents, British capitalists would do right in slowly giving credence to the fact, and lending their aid to what might then be justly called a doubtful enterprise. But in the above tables—differing merely from those of the Mines Department in their greater fullness, clearness and typographical accuracy—we have the *sworn* results of NINE YEARS, not from one mine alone but from several, and from the extremes as well as the centre of an auriferous belt more than three hundred miles long and in places over sixty broad; and those results are not inferior to, but really in excess of the averages obtained per man and per ton in seemingly preferred distant alien countries; At the present writing thirty non-dividend *foreign* mines are quoted in the London Stock Exchange List with a paid-up capital of three and a half million pounds, and subject to calls of half a million more; yet the only industry which could promote the growth of one of England's nearest colonies, enjoying a healthy climate and offering full security to life and property (which cannot be said of some of the distant regions alluded to), is wholly overlooked. Seventy-five per cent. of the declared gold yield has been raised through alien—chiefly American—enterprise, and nearly one-twelfth came from a single mine, the Wellington. Last year Mr. A. R. C. SELWYN, Director of the Geological Survey of Canada, who during fifteen years held a similar position in Victoria, Australia, critically examined Nova Scotia's different gold districts, and has placed upon record his opinion that, 'divested of speculation, and conducted with the same skill, forethought, and proper amount of capital necessary for the success of any commercial enterprise, gold mining will become here, as in Australia, a lasting, profitable, and important national industry.'" In our columns devoted to mining news will be found fuller extracts from this pamphlet.

THE PLIOCENE SKULL, by BRET HARTE. Illustrated by E. M. SCHAEFFER, M. D., Washington, D. C.

The works of BRET HARTE, having achieved a popularity as sudden and wide as it is genuine and well deserved, have suffered the fate of "illustration" at the hands of many volunteer artists, who have sought to float above the ocean of oblivion by attaching themselves to these buoyant life-preservers. But these attempts to reproduce in pictures the spirit of his sketches of western life and character have been as unfortunate as the more numerous attempts to imitate him in literature. Aside from wit and humor, Mr. HARTE's productions possess two qualities in a striking degree, namely, truth to nature and good taste. The slang of his characters is neither forced nor blasphemous, and their actions may be paralleled, fact for fact, out of the social chronicles of the Pacific slope. Even in his "Condensed Novels," which give less scope for these qualities, there is a perceptible delicacy and restraint, preventing the burlesque from degenerating into mere buffoonery. It has been well remarked that his imitations of different authors generally convey a fine satire upon their philosophies and modes of thought, as well as their peculiarities of style merely.

But how grossly have these refinements been misunderstood by the "illustrators." CARLETON's edition of the Condensed Novels, published some years ago, was defaced with wood-cuts as coarse in their humor as the broadest caricatures of the funny papers; and this circumstance undoubtedly delayed the public recognition of the author's talent. Persons attracted by such illustrations would expect a "roaring" book, and would be puzzled and bored by the subtle humor of the text; while those who could appreciate the latter, would scarcely think of purchasing or reading a volume which promised pictorially to be nothing more than another Widow Bedott.

Then we had an illustrated edition of the "Heathen Chinee," in lithographed leaves, of which it must be said that it is as far from being appropriate or true as it is from being funny. There is neither character nor meaning nor accurate drawing in it.

The recent illustrations in *Harper's Weekly* are good, but rather tame. The artist lacks personal knowledge of the West and its people.

But we did not mean to dilate upon this matter in a fault-finding spirit, further than to introduce the remark that the little book which we are now called to notice is the best thing in this line that has hitherto appeared. The poem of the Pliocene Skull was long ago published in our columns. It is a good-natured satire upon the celebrated Calaveras skull, discovered at the bottom of a mining shaft at Altaville, near Angels', Calaveras county, California, in 1866, and ever since that time an object of lively discussion among the geologists. In the poem, the author, playing the part of an awe-struck scientific inquirer, interrogates the skull as to its history, and finally receives the reply, in "hollow accents, blent with softer murmurs of expectoration,"

> "Which my name is BOWERS, and my crust was busted
> Falling down a shaft in Calaveras county;
> But I'd take it kindly if you'd send the pieces
> Home to old Missouri!"

Among Dr. SCHAEFFER's capital illustrations to this poem the best, in our opinion, are the two portraits of the historical BOWERS and that of the innocent professor in his study, profoundly contemplating the skull. The sketch of the supposed Palæozoic man, fishing calmly in a lake bordered by forests of carboniferous vegetation, while winged reptiles play the part usually occupied in our sporting pictures by ducks or wild geese, flying over the water, is very good; as is likewise another, representing primeval Homo, standing unmoved with folded arms, like DANIEL OR VAN AMBURGH in the lions' den,

> "When beside thee walked the solemn Plesiosaurus,
> And around thee crept the festive Ichthyosaurus,
> While from time to time above thee flew and circled
> Cheerful Pterodactyls."

The poem is both in measure and in plan an imitation of CANNING's "Needy Knife-Grinder." It is a dangerous thing to imitate a burlesque, but Mr. HARTE has accomplished the feat successfully; and it is a difficult thing to illustrate a burlesque without violating the *ne quid nimis*, but this Dr. SCHAEFFER has done with equal skill and tact. People who have been carrying the Pliocene Skull about in the form of a newspaper extract, ragged and dim with much handling, and would like to preserve these interesting literary, if not geological, remains in more enduring form, will thank the accomplished artist for completing so happily the poet's work.

The Cooper Union Commencement.

THE general commencement exercises of the Cooper Union took place on Wednesday evening, May 31, in the large hall, which was crowded by an attentive and enthusiastic audience. The most interesting feature of the evening's exercises was the presentation of an address to the venerable founder, Mr. PETER COOPER, congratulating him on the recent completion of his eightieth year, and expressing the love and gratitude of the thousands of students whom his benefactions have blessed. The address was conceived in excellent taste, and the engrossed copy of it was framed and mounted with great magnificence. We have room only for the reply of Mr. COOPER, which seems to us well worthy of preservation.

REPLY OF MR. COOPER.

MY YOUNG FRIENDS: If I needed any reward for my humble efforts to benefit my fellow-men, the touching language of your address, and this expression of your affection and gratitude, would be ample compensation for labors however exacting and sacrifices however great. Happily, however, works of benevolence carry with them their own recompense, even though they do not meet with the recognition which has fallen to my lot, and which makes me feel that this occasion is the crowning happiness of a life which has passed its eightieth anniversary.

In that long experience I have learned lessons which, if I could induce you, my young friends, who have your future before you, and others who have left their past behind them, to lay them to heart, and to practice in the conduct of life, would greatly lessen the evils of society and improve the condition of the land and the time in which we live. While yet a child, I learned that the "hand of the diligent maketh rich," and whatever of wealth I have achieved has been due, primarily, to habits of patient industry formed at the outset of my career. I soon learned that "waste makes want," and I therefore saved what I earned, and, by taking "stitches in time," guarded against the loss which unavoidably attends upon neglect and want of foresight. It did not take long for me to learn that drunkenness was the parent of the larger portion of the poverty, vice, and crime which afflict the American people; and hence, until advancing age seemed to demand moderate stimulants, I carefully avoided alcoholic liquors as the greatest curse of the young, and the most deadly foe to domestic happiness and the public welfare.

Next, I observed that most of the shipwrecks of life were due to debts hastily contracted and out of proportion to the means of the debtor; and hence I always avoided debt, and endeavored to keep some ready money on hand to avail of a favorable opportunity for its profitable use. With economy and industry it is easy to do this in this favored land; and in my case the result has been that, amid all the financial revulsions through which I have passed, no obligation of mine has ever been a day in arrear. Debt is a slavery which every young man ought to avoid, or, if assumed, ought not to endure for one day beyond the shortest time necessary to set him free. Shunning intemperance and debt, and practicing industry, rigid economy, and self-denial, it was easy to be honest, and to acquire such knowledge as the opportunities of this city offered in the days of my youth. But these opportunities were so limited—there being no free schools by day, nor any night schools whatever—that I found it far more difficult to learn what I wanted to know than to be industrious, temperate, and prudent. Hence I decided, if I should prosper in the acquisition of worldly means, to found an institution to which all young people of the working classes, who desired to be good citizens and to rise in life, could resort, without money and without price, in order to acquire that knowledge of their business and science which, in these days, is absolutely indispensable to a successful career. Providence, in accordance with the declaration that to "faith all things are possible," did bless my efforts; and this institution, and these encouraging evidences of its value and its fruits, presented here to-night, is the result of this resolution, never lost sight of during a business career of nearly sixty years; in which I was cheered, comforted, sustained, and encouraged by the greatest of human blessings—a diligent, wise, industrious, faithful, and affectionate wife; and in the work of founding this institution, aided by the earnest sympathy and active co-operation of my children, who justly regarded as the richest portion of their inheritance that part of my wealth which I desired to consecrate to the public welfare. Hence my last lesson for the young is to marry at the proper age when, *and not before*, they can see the way clear to a decent and comfortable support, and thus fulfill the first law of nature with a high and holy sense of its happiness, and its duties, the greatest and most serious in the path of life. *Love and duty* I have ever found to be the password of all that is true and noble in life, and, when they are separated, the fires on the family altar die out and life loses all its charms, never to be compensated by the false jewels which are often worn in the public gaze.

These are, indeed, simple truths, which I have endeavored to set forth in words equally simple, because I feel sure, from a very long experience, that they will do good to every young man and young woman who will firmly resolve to make them the rule of life, and because I began life without any means, and know the truth of what I affirm.

But, having also acquired what is regarded as riches, have I earned the right, by the use I have made of them, to give any advice or speak a word of encouragement to others, who, by the will of God, are intrusted with the great responsibility of wealth? Whether I have this right or not, I feel impelled to record my conviction, derived from personal experience, that the rich man who regards his wealth as a sacred trust, to be used for the welfare of his fellow-men, will surely derive more true enjoyment from it in this world than from the most lavish expenditure on mere personal enjoyments and social display. I do not pretend to prescribe any standard of expenditure for others, and I am quite ready to subscribe to the doctrine that a just and faithful trustee should be liberally paid for his services, and should not be restricted in the reasonable gratification of his desires, so long as the rights of others are not thereby infringed; and I desire to give the fullest recognition to the sacredness of private property, and the conservation of capital, as for the best interests of society and all the members thereof; but I cannot shut my eyes to the fact that the production of wealth is not the work of any one man, and the acquisition of great fortunes is not possible without the co-operation of multitudes of men, and that therefore the individuals to whose lot these fortunes fall, whether by inheritance or the laws of production and trade, should never lose sight of the fact that, as they hold them only by the will of society, expressed in statute law, so they should administer them as trustees for the benefit of society, as inculcated by the moral law.

When rich men are thus brought to regard themselves as trustees; and poor men learn to be industrious, economical, temperate, self-denying, and diligent in the acquisition of knowledge; then the deplorable strife between capital and labor, tending to destroy their fundamental, necessary and irrefragible harmony will cease; and the world will no longer be afflicted with such unnatural industrial conflicts; as we have seen during the past century in every quarter of the civilized globe; and latterly, on so great a scale in this country, arraying those, whom nature intended to be firm allies and inseparable friends, into hostile camps in which the great law of love and mutual forbearance is extinguished by selfish passions.

The law of force, whether expressed in trade associations, preventing other men from exercising their inalienable right to labor where they can find work, or in combinations of capitalists, seeking by lock-outs to close up the avenues of labor, are equally reprehensible, and should never be allowed under any provocation whatever to take the place of the Divine law, "Whatsoever ye would that men should do unto you, do ye even so unto them;" nor will such an unnatural and criminal substitution ever be possible; if poor men will remember that it is the duty, and therefore the right, of every poor man to strive to become rich by honest, intelligent and patient labor; and if rich men will remember that the possession of wealth, which is the fruit of the general effort, confers no right to its use, as an engine of oppression or coërcion upon any class which is concerned in its production.

Let me then record that, during a long life passed in active business, I have never known any but evil consequences to all classes, and especially to the innocent, to result from strikes, lock-outs, or other forcible measures, designed to interfere with the steady and regular march of productive industry, and I feel justified in an earnest appeal to both workmen and capitalists, henceforth to regard each other as equals and friends; and to imitate the great example, so recently set by the enlightened governments of Great Britain and the United States, in the submission of their differences to arbitration; and not to expect to reform social evils by combinations designed to force either side into the acceptance of unpalatable terms, by the stern logic of starvation and indiscriminate ruin.

Reform, to be of any permanent value, must be based upon personal virtue, not force; and it seems to me that the millenium will not be far off, when each individual shall set about reforming himself rather than society, and conforming his life to the great law of loving God and his fellow men.

While I thank you again my young friends, (I had almost said my children), for this manifestation of your respect and gratitude, so touching because so full of love; let me ask you to accept of this feeble but heartfelt reply, as a kind of last will and testament of the garnered experience of an old friend, whose days are almost numbered, and who asks only to be remembered as "one who loved his fellow men."

DEPARTMENT OF POPULAR SCIENCE.

Our Noses.

YES, madam, as you say, the butter is "too strong." That is, you and I, following our noses, as it were, turn from it with displeasure. But a Laplander, following his nose, would reject it if it had not the very stench which we condemn. The Laplander is an epicure, you see, and treats butter and tallow as we do venison. Even civilized people, who might agree with us as to butter, have the silliest opinions, quite contradictory to ours, on other odorous subjects. We know that the perfume of valerian is disagreeable; but there is that vulgar Miss Othernose, loves it like a cat. Old Lady Whatasmeller longs for burnt hair, and says a sniff at it is good for her hysterics; and those two Layiton sisters will go into society strongly scented, one with clove and the other with musk, though all sensible people—that is, you and I—know very well that a faint touch of these perfumes is pleasant, but a strong smell disgusting.

But I fear we are not even consistent with ourselves. For instance, is not the odor of fried oysters delicious to us when we are hungry, and quite the contrary after we have disposed of two fries and a stew at DORLON's? Bodily conditions, habits, and associations seem, after all, to lead us by the nose, or to put it differently, we do not really follow our noses, but push them.

It is somewhat remarkable that we can not define any odor except by comparing it with something we have smelt before. We say it is like violets or varnish. And how often does a whiff of fragrance remind us vaguely of some former experience, which we cannot recall. We stand like idiots, sniffing, and sniffing, and waiting for the lost idea. The nose, madam, instead of being a mere unnecessary protruberance, is the portico of the soul. It apprehends the unspeakable; it is the organ of memory; the speaking-trumpet of the past. Refined insects talk with their noses, and unconventional barbarians, instead of kissing, rub noses, a practice which, though more indicative of platonic soul intercourse, you and I, madam, would not care to see revived. Kissing is, by all odds, the most—but we have fallen an inch below our proper theme. Let us climb again to the serene height of the nose.

What is smelling? Now, don't pull out your *vinaigrette*, madam, by way of giving me a practical illustration. The keen and pungent sensation produced by spirits of ammonia is no smell at all, but a painful irritation caused by the vapors of that substance in the fibres of the nerves of touch spread through the cuticle of the nose. The smell of ammonia is not distinguished in the presence of this overpowering sensation of touch. When you have a severe cold, and cannot really smell anything, you are still sensitive to the acute impression produced by hartshorn or horse-radish.

Doubtless you have noticed, also, that in such a condition your taste appears to be affected. You say, sometimes, you have such a cold that you cannot taste anything; but this is an illusion. You taste as well as ever; but a great many flavors which you perceive, as you think, by the tongue, are really odors, which ascend from the throat through a little postern-door into the nasal cavity. Perhaps we may hereafter chat a little about our tongues; and then I can explain to you that the real tastes are exceedingly few and simple—such as bitterness, sweetness, etc.—that they are always separately

perceived, and that the complex sensation which determines to us the peculiar flavor between food and drink, is largely made up of smell. When we eat or drink too fast, we get the taste, but do not fully enjoy the flavor. Thus, the *connoisseur* in wines sips slowly, in order that upon each drop he may receive the report of that superior judge, the nose, which alone makes fine distinctions.

But what do we smell? Apparently nothing but gaseous or volatile substances, such as can be conveyed to us by the air. Solid bodies, such as powders (I wouldn't say *snuff*, madam, in your presence), can be introduced into the nose; liquids can be squirted or poured into it; but according to the most careful experiments, these substances may excite irritation, but not smell. A very interesting and not at all painful experiment has been made in illustration of this.

One man reclines upon a long table, and hangs down his head over the edge, so that the nostrils turn upward. His nose can then be filled with liquid as if it were a tumbler, there being a soft valve at the bottom which, in this position, closes the passage into the throat. Now, no liquid which cannot be smelt by holding the nose over it—that is, by inhaling its *vapor*—can be smelt when poured into the nose in this way. Indeed, it almost seems that substances ordinarily odorous are not perceived when thus applied in solution. Thus we may fill the nose with water, containing a few drops of *eau de Cologne*, and a sensation of smell will only result while we are pouring it in. When the nose is full, so that vapors cannot get access to the smelling apparatus, the sensation vanishes; but in this case there is probably a temporary mechanical injury inflicted upon the delicate olfactories, since even pure water used in this way will suspend for a time the faculty of smell, so that after its removal strong odors cannot be perceived.

But though gaseous or volatile bodies are probably the only ones we can smell, it is not true that all gases and vapors are odorous—at least to you and me. For instance, the air itself, and the water which exists in it in the form of vapor, are without odor to us. Perhaps some animals can smell water—they act as if they could; but you and I—goodness gracious! if we should find our Croton to possess a distinguishable fragrance, we would turn from it in horror, and do something desperate—perhaps move to Jersey, and drink Hackensack.

Some people think our noses are set to stand guard over our mouths, and blow a warning note when anything injurious approaches for admission; but this is a somewhat exaggerated idea. As we have seen, solids and liquids are without odor. Moreover, many gases which are poisonous to breathe have no smell, and hence the nose is incapable of warning us against them. Again, some highly poisonous substances are deliciously fragrant—for example, prussic acid; and finally, the pungent sensations of touch, rather than smell, produced by many vapors—for instance, those of burning sulphur—would cause us to reject them, even if they were conducive to health. There is nothing to be done but to educate our noses till they make, so to say, correct diagnoses.

But how do we smell? A very pertinent question of yours, madam, and one which it would give me pleasure to answer fully. Unfortunately, I don't know, and it is some consolation to add that nobody else knows, exactly how this operation is carried on. But a good many interesting facts have been observed, and quite recently some highly important microscopical discoveries have been made, which lead us to hope that before long we may know as much about smelling as we do about seeing and hearing. I will tell you something on that head presently. Meanwhile, as you justly observe, this butter *is* bad. You had better send it to the suffering French. Their noses being out of joint, they may not mind the odor.

I propose, madam, to give you some notion of the revelations of science as to the *modus operandi* of smelling, warning you at the same time that our knowledge on this subject is still comparatively vague and incomplete. We know that the sensation of smell occurs when a certain nerve, which rises in the brain and spreads its extremities through the nose, becomes affected by a gaseous, odorous substance. The nerve of smell looks like an ordinary nerve of touch, sight, or hearing, or even a muscle-nerve, the current of which produces contraction of the muscle and motion of the limbs. Even the nerve-current appears to be in all these cases of the same nature.

You ask why, then, we do not have the same sensations from all the nerves? A difficult question; though we may reply in a general way that the nerves are like wires conducting electricity. The same copper wire, with the same electric current, may move for us the hands of a clock, or fire a charge of gunpowder, according to the apparatus at its extremity. Probably the nerve-current, like the electric current, is a convertible force, the results of which may appear in different forms, according to the means by which they are converted. Apparently some nerves are sensitive to particular reactions only. It is true, indeed, that all the nerves have a general sensibility in common. Probably they all feel heat, pressure, and pain; but the specific sensations, apart from this common feeling, appear to be due wholly to the locality in the brain receiving the nerve-report. Thus electricity, which is an irritant to all the nerves, excites in the optic nerve the sensation of light, in the auditory nerve the sensation of sound, etc. Whether it has ever been applied to the nerve of smell, and if so, how it smells, I cannot say.

Now, the difference in the apparatus in the brain, at the extremities of the various nerves, we have never been able to recognize, though it is inconceivable that it should not exist. To our coarse means of investigation nothing appears but small, dark, granular vesicles or cellules, which belong alike to the inner extremities of all the nerves of sense. We cannot yet discern what is the process produced in these vesicles by the nerve-current, nor how it differs in the organ of smell from the process of other senses, nor how it is translated by the consciousness into the idea of smell. These points, madam, are among the exceedingly few things that I do not know.

With regard to the apparatus at the other or exterior end of the nerve of smell, we are slightly better informed. Until quite recently, nothing more could be said than that its fibres probably terminated in fine points on the fundamental tissue of the cuticle of the nose; but this was exactly what was said of all other nerves, merely changed as to locality. We have now discovered what appears to be a characteristic olfactory apparatus, though we are far from understanding how it operates.

The partition between the nostrils (corrugated, as it were, within, so as to increase its surface) is lined with a soft skin, or cuticle, in two layers of membrane directly overlying the bony wall. The under layer is a net of fine fibres, filled with a soft substance. Over this is an external coating, consisting of innumerable small, oblong, cylindrical vesicles, standing close together, on end. Each of these has a pointed rear extremity, by which it is attached to the lower membrane, and a broad front extremity, directed toward the nasal cavity. On this broad end stands a wreath of extremely minute and delicate hairs, which maintain continually a peculiar motion. Each hair rapidly bends in a certain direction, and rises again, the whole appearing not unlike the waving of a field of grain. Come away from the looking-glass, madam; it is useless to study your own nose in that way. What I am describing can be seen with the microscope only; and even with that wonderful instrument these little hairs, or *cilia*, as they are called, cannot be distinguished while in rapid motion. There is visible a glimmer or flicker along the edge of the vesicle, produced by the oscillation of the hairs.

The most wonderful thing about this ceaseless motion is, that it goes on without volition, and lasts even for a short time after death. It is by watching the movement as it slackens, and finally expires, that microscopists can recognize its nature. Its cause physiology cannot explain. We must be content for the present with the knowledge that the surface of the nasal cuticle is covered with these ceaselessly waving *cilia*, set in circles on the outer ends of the vesicles. Now, into this cuticle, and through it in all directions, spread the minute fibres of the nerve of smell, which almost elude even the microscope. According to recent discoveries, each of these fibres affixes itself to the pointed rear extremity of one of the ciliated vesicles; and we are justified in looking upon the latter as the end-organs of the nerve of smell. Upon them the odorous substances act, producing in the vesicle, as acids produce in a battery, a process which develops a current along the connecting fibre to the brain. But we cannot even guess how one substance affects this apparatus differently from another. The problem is, perhaps, the most difficult and complex in the range of the senses. The differences of colors and sounds are simple and comprehensive enough, compared with this bewildering subtlety and multiplicity in the action of the olfactories.

But the nose has another function besides that of smelling. I refer to the melodious vibration known as snoring, a faint but well-defined instance of which just now proceeded, madam, from your own delicate organ. To the soft accompaniment of such a serenade I can only say good night. Soft be your slumbers, while the odors of June's sweetest roses gently titillate the ciliated epithelium of your aristocratic nostril, which responds in æolian strains to their touch. R. W. R.

Tin-Lined Lead Pipe.

FROM a recent number of the *Building News*, an English periodical, we learn that these pipes are being introduced in England. The pipe is made in essentially the same way as that which has for several years been before the people of this country, manufactured by the Collwells, Shaw and Willard Manufacturing Company of this city.

The following certificate from EDWIN LANKESTER, M.D., F.R.S., tends simply to confirm the views of some of the best chemists in our own country: "I have recommended slate cisterns and gutta percha tubes for the storage and transmission of water for dietetic purposes. I have now, however, no hesitation in saying that the lead-encased block-tin pipe and tin-plated sheet lead, manufactured by Messrs. WALKER, CAMPBELL & Co. are superior to any other materials I have seen for pipes and cisterns. I have tested these pipes for several weeks with great care, and have exposed them to the action of various kinds of water; in no case have I discovered in the water the slightest trace of lead, tin, or any other mineral matter whatever. I have submitted the pipes to the action of distilled water, Thames water, water from artesian wells in London, and to water highly charged with organic matter; and in no case when these waters have been exposed to the usual reagents for detecting the presence of tin or lead has the slightest quantity of these metals been detected. I have, therefore, satisfaction in recommending the lead-encased block-tin pipes, not only as an admirable invention, and well adapted for supplying water in a pure condition, but as a means of rendering our water supply throughout the kingdom free from the dangerous lead-taint with which it is now so frequently affected.' 29 Great Marlborough street, London, December 29, 1869.

We take the following items from the official returns of the Austro-Hungarian duty district:

	IMPORTATIONS IN 1869. Cwts.	1870. Cwts.
Coals and brown coals	13,700,000	18,200,000
Pig iron	3,092,297	3,218,380
Rails	2,298,432	2,338,865
Iron, good (roughest)	490,565	584,340
Iron castings (rough)	216,292	171,369
Refined iron	383,114	272,499

IMPORTANT TO INVENTORS.

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CHARLES ROGERS, Solicitor and Manager.

In connection with the publication of the MANUFACTURER AND BUILDER, we have frequently received applications from subscribers and patrons to act as their agents in transacting business with the United States Patent Office; and in view of the increasing number and urgency of such requests, we have resolved to add this department to our business. We have accordingly organized

A COMPLETE PATENT AGENCY,

and now offer our services in procuring patents in this and foreign countries, and transacting all business relating to the obtaining of patents.

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Our charges are as moderate as those of any other responsible patent attorneys, as will be seen from the following figures: For preparing a case (whether simple or complicated) and attending to its passage through the Patent Office, our fee is from $30 to $40, which includes all the necessary papers and drawings. If the application is rejected we make no further charge, but prepare all necessary amendments, and, if requisite, appeal to the Board of Examiners-in-Chief. Most Patent Attorneys make an additional charge on each adverse action of the Patent Office, but we have found it more satisfactory to all parties interested to make our full charge at first; and as we expect no contingent fees, it is to our interest to prepare our cases properly at the commencement, thus avoiding annoyance to ourselves and delay in getting out the patent.

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our fee	$30 to 40
final Government fee	20
Total	$66 to $76

If the case has to be appealed, the applicant pays the Government fee on appeal, $10; but we shall ordinarily make no additional charge for our services. The first two items are payable when the application is sent in, and the second Government fee when a patent has been allowed. Before an appeal is taken, in any case, the applicant will be fully advised of all facts and charges, and no proceedings had without his sanction; so that all inventors who employ our agency will know in advance what their applications and patents are to cost.

We have engaged as solicitor and manager Mr. CHARLES ROGERS a well-known expert in this department. Being a practical mechanic, and having been an examiner in the Patent Office at Washington for a number of years, besides enjoying an experience of more than twenty years as a solicitor of patents, Mr. ROGERS is intimately acquainted with all the details of the business, both in and out of the office.

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For attending to the obtaining of Reissues, Extensions, etc. and preparing Assignments, our charges vary according to the labor involved.

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Inventors who reside out of New York, and wish to procure a patent, need not go to the expense of visiting this city or Washington, but may send us a model of their invention, or a sketch and brief description; this will enable us to decide as to its probable novelty and patentability, and we can proceed at once to prosecute the case. We shall, however, be glad at all times to see our friends from any section, and give them such information as we are possessed of relating to patents, free of charge. A Post-office order for $16, to pay the first Government fee and stamp duty, should be sent along with the model; our fee $30 $40, being payable as soon as the application is ready to be sent to Washington.

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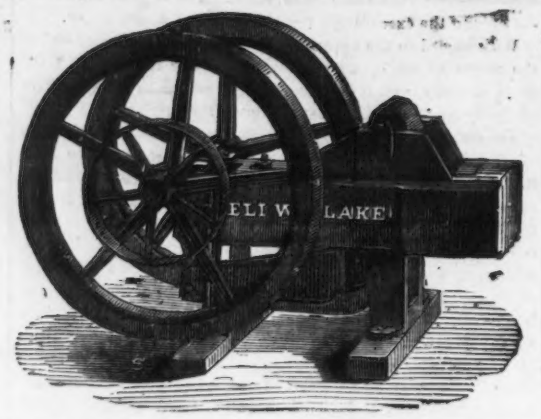

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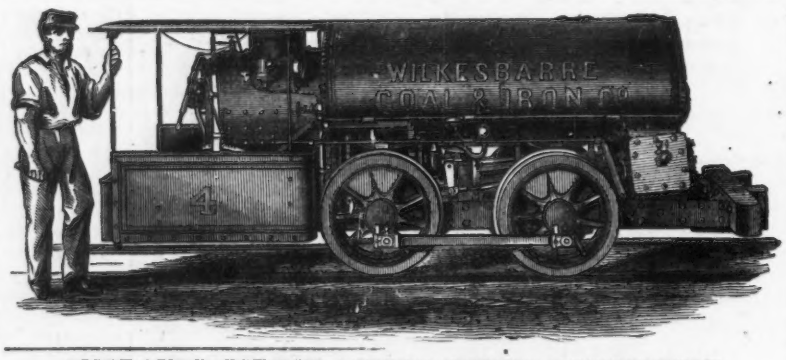

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1871.

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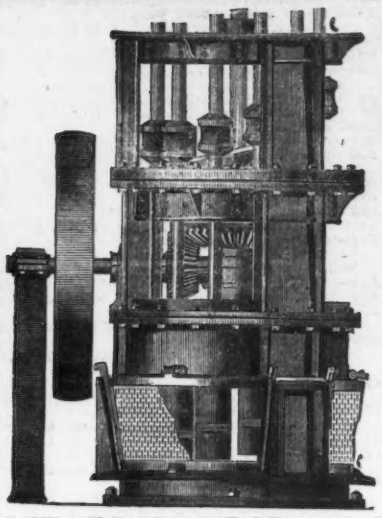

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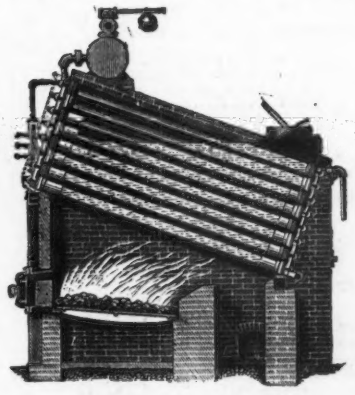

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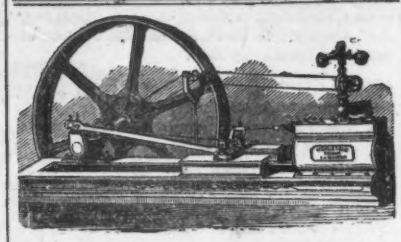

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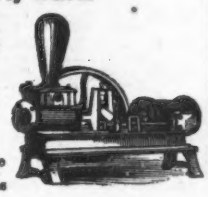

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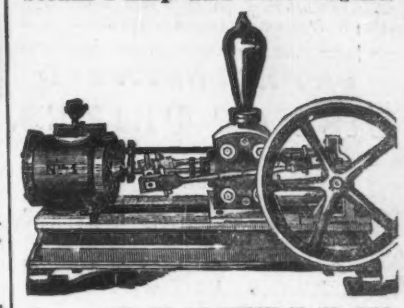

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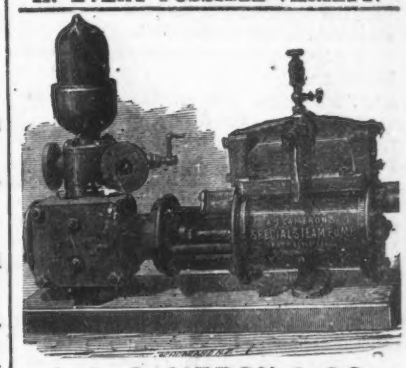

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156	A choice of popular Music (see terms in special sheet)			
157	A choice of Games and Toys, (see terms in special sheet)			

We have taken especial pains to select in making up our price list the NEWEST and very BEST articles. No charge will be made for boxing or packing any article on our list. The Premiums, Nos. **4** to **7** inclusive, **31** to **35** inclusive, **75**, **99**, **101**, **105** to **108** inclusive, **121** to **128** inclusive, **137** to **141** inclusive, **154**, **156**, **157**, will each be delivered FREE of charge by mail or express (at the Post-office or express office nearest recipient) to any place in the United States or Territories. The other articles cost the recipient only the freight after leaving the manufactory of each, by any conveyance specified.

As an aid to those who engage upon large clubs, we will count subscriptions by *one* individual for 1869, 1870, and 1871, as *three* subscribers toward a premium. Every *new* subscriber should have the work from the beginning. Bound volumes may be counted in the same way—each as one subscriber—except, of course, when they are obtained as a premium.

Do not fail to note the following Points:

1. All subscribers sent by one person count, though from one or a dozen different post-offices. But

2. State with each name or list of names sent that it is for a premium.

3. Send the names as fast as obtained, that the subscribers may begin to receive the paper at once. You can have any time, from one to six months, to fill up your list.

4. Send the exact money with each list of names, so that there may be no confusion of money accounts.

5. Old and new subscribers all count in premium clubs, but a portion, at least, should be new names; it is partly to get these that we offer premiums to canvassers.

6. Specimen numbers, cards, and show-bills will be supplied free, as needed by canvassers; but they should be used carefully and economically, as they are very costly.

7. Remit money in Checks on New York banks or bankers, payable to order of WESTERN & COMPANY, or send Post-Office Money Orders. If neither of these is obtainable, Register Money Letters, affixing stamps both for the postage and registry; put in the money and seal the letter in the presence of the postmaster, and take his receipt for it. Money sent in any of the above ways is at our risk.

DESCRIPTIVE LIST OF PREMIUMS.

Every Premium in the annexed list is described in the December MANUFACTURER AND BUILDER, *and also in a* **Special Descriptive Sheet,** *which will be sent* **free** *to every one desiring it. We have room here for the following only:*

No. 1—Chest of Good Tools.—We are able, through the special favor of Messrs. Patterson Brothers, of 27 Park Row, to offer chests of the very finest quality of tools, of kinds and prices named below. Similar tools could be purchased for half the money; but these are all A No. 1, for practical use, and worth a dozen common articles. For this we have the guarantee of Messrs. Patterson, which is amply sufficient for us, and for all who know them. Any of these tools may be ordered of them. We make up only a single premium, which contains a full assortment for all common purposes. The tools are of regular size, and but few additions would be required for a journeyman carpenter. The assortment we offer is as follows: 1 tool-chest, $8; 1 jack-plane, $1 75; 1 smooth-plane, $1 50; 1 fore-plane, $2 25; 1 handsaw, 22 in., $1 75; 1 compass saw, 10 in., 50c.; compass, 6 in., 37c.; 1 adze-eye hammer, No. 4, $1 25; 1 hatchet, No. 2, 90c.; 1 draw-knife, 7 in., $1 12; 1 try-square, 6 in., 70c.; 1 bevel, 8 in., 75c.; 1 chalk-line and spool, 30c.; 1 mallet, 30c.; 1 pair of pliers, (steel,) 5 in., 60c.; 1 pair of calipers, 4 in., 35c.; 1 brace, No. 2, $2 25; 1 auger-bit, ea., ¼ in., 30c.; ⅜ in., 32c.; ½ in., 45c.; 1 in., 60c.; 1 centre-bit, ea., ¼ in., 21c.; ⅜ in., 23c.; 1 in., 25c.; 1¼ in., 35c.; 1½ in., 40c.; 6 gimlet-bits, assorted, 90c.; 3 gimlet-bits, assorted, 33c.; 1 screw-driver bit, 25c.; 1 flat countersink, 25c.; rose, do., 25c.; snail, do., 25c.; 1 octagon reamer, 30c.; 1 taper-bit, 30c.; 1 screw-driver in handle, ea., 3 in., 30c.; 6 in., 50c.; 1 gouge in handle, ea., ½ in., 50c.; 1 in., 70c.; 1 chisel in handle, ea., ¼ in., 30c.; ½ in., 35c ¾ in., 40c.; 1 in., 50c.; 1¼ in., 60c.; 1 framing-chisel ea., ¾ in., $1 1 in., $1 10; 1¼ in., $1 20; 1 auger, ea., ¾ in., 70c.; 1 in., 80c.; 1¼ in., 90c.; 1 set bradawls in handles, $1 35; 1 rule, 2 feet, 25c.; 1 saw file, ea., 4 in., 14c.; 5 in., 17c.; 1 flat bastard file, 8 in., 30c.; 1 wood-rasp, 50c.; 1 soldering copper, 60c.; solder nails, etc., $1 25;=**$45 00.**

Nos. 2, 3—Mathematical Instruments for Draughting, Drawing, Etc.—Very convenient not only for architects and mechanics, but for boys and girls. These are neatly fitted in beautiful rosewood cases, having dividers with flexible joints, and points, semi-circles, pencil and penholders, rulers, etc., etc. All the pieces in No. 2 are finished in brass and steel; those in No. 3 are German-silver and steel. The pieces are the same in each, but No. 3 is of extra beauty and workmanship. 18 subscribers at $1 50 each secures No. 2, and 22 at $1 50 each, No. 3.

Nos. 4, 5, 6, 7—Pocket Knives.—Here's for the boys and girls. These premiums are among the most pleasing and useful that we have ever offered. Every boy, and girl too, wants a pocket knife. We give them an opportunity to obtain a most valuable one for merely a little effort. These knives are from Messrs. Patterson Bros. No. 4 is a neat, substantial knife, with three blades and buck-horn handle. No. 5 is a still finer article, with four blades and buck-horn handle. No. 6 is an elegant knife, with four blades and shell handle. No. 7 is a lady's pocket-knife, a beautiful article, with four blades and shell handle.

Nos. 8, 9, 10, 11, 12, 13—American Table Cutlery.—We are glad to be able to offer really good articles of American manufacture, such as are competing successfully with the best foreign goods. *Messrs. Patterson Bros., 27 Park Row,* who supply us with these articles, are also importers of European goods. They recommend these knives, manufactured by the *Meriden Cutlery Co.*, as equal to any cutlery in the market, and their recommendation is a guarantee wherever they are known. We offer four kinds knives, and three sizes of each kind. No. 8 have rubber handles, which are actually boiling-water-proof, so that, if they were accidentally to remain in it for several minutes, or even hours, they would not be injured. The blades are of the best steel, and warranted Dessert size, with forks, sold at $14. For 23 subscribers at $1 50, or 78 at $1, we will give either the medium size or the table size, sold at $15 50. No. 9 have ivory handles, are selected with great care, have steel blades, and are beautiful goods. Dessert size, with forks, sold at $18 50. For 31 subscribers, at $1 50, or 100 at $1, we will send the medium size, sold at $20 50. For 34 at $1 50, or 112 at $1, we will send the table size, sold at $22 50. No. 10 are made of solid steel, and are triple-plated all over with pure silver, which will wear for a long time, while the knife is actually indestructible by ordinary use. Dessert size, with forks, sold at $22. For 37 subscribers, at $1 50, or 118 at $1, we will give the medium size, sold at $24 50. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25, No. 11 have steel blades, triple-plated with silver, and larger ivory handles, and are really splendid goods. Dessert size, with forks, sold at $25 50. For 42 subscribers, at $1 50, or 128 at $1, we will give the medium size, sold at $28. For 45 subscribers at $1 50, or 143 at $1, we will give the table size sold at $30 50. The forks, which accompany these premiums, Nos. 8, 9, 10, are made of genuine albata, and warranted double-plated with coin-silver. The forks with No. 11 are warranted triple-plated with coin-silver. These forks are also furnished to us by Messrs. Patterson Bros. The carving-knife and fork, and fluted steel, are made by

th Meriden Cutlery Co., with the best ivory balanced handle.

Nos. 14 to 29—Silverware for the Table.—What would become of elegance and refinement in the furnishing of homes if the ladies (God bless them!) had not such an amiable passion for endlessly beautifying everything around them? Ever since Eve first set out the fruit of Paradise on its broad leaves to entertain the angel guests of Adam, it has been the province of her lovely daughters to spread the social board with attractions still more tempting to the eye than to the palate. What, that becomes a woman, will not a woman do to make her table shine? We condole with them that their means are not always equal to their good taste, and propose that henceforth no lady shall lack a lustrous silver tea-set, or other piece of similar elegance, unless she chooses to. Look at the following premiums, all of the celebrated manufacture of Messrs. HALL, ELTON, & Co., 36 Park Row, New York; No. 28 is silver-plated, gold-lined, beautifully chased **Tea Set** of six pieces, consisting of a coffee-pot, two tea-pots, a creamer, a sugar-bowl, and a slop-bowl. The style of this set is very neat, new and elegant. Messrs. Hall, Elton & Co, warrant these goods to be their best triple plate. This is a very desirable premium. No. 29 is a tea-set with same number of pieces, triple-plated, plain, new style.

Nos. 31, 32, 33, 34, 35—GOLD PENS, Rubber Mounted with Ever-Pointed Pencils—Pens in Gold and Silver Holders—Pens and Pencils in Extension Cases.—No. 31 has a gold-mounted rubber case, with pencil, and a No. 4 gold pen, manufactured by MABIE, TODD & Co., 180 Broadway, New York. This and the next, No. 32, are, we think, really the best things of the kind manufactured. The fact that hard rubber is used, shows that the gold for the mountings, etc., is of the finest quality, as rubber, on account of the sulphur contained in it, can not be mounted with any other without tarnishing. When closed, the pencil No. 31 is only 5 inches long, (No. 32, 3¼ inches,) but it opens to a length of 5¾ inches. The price for the holder and pencil of No. 31 is $6, pen $2; and of No. 32, or smaller size, $5 for the case, and $1 75 for the pen. Fifteen subscribers will give you the former, or gentleman's size, and 13 the latter, or lady's size. No. 33 is a No. 6 gold pen, with silver or gold-plated holder with an ebony handle—a very neat, desirable business-pen. By describing the kind of pen you prefer, we can probably select one that will suit your hand perfectly. We send these by mail, in a neat turkey morocco box, lined with velvet, in which they can be kept, protected from injury. No, 34 is a large pen, in a fine extension case, round or fluted, and richly engraved. The gold is 14 carats fine. These pens, which are nicely put up in boxes, are a very beautiful thing for a present. Price $20, and sent, postage paid, to any address, upon receipt of 29 subscribers at $1 50 each. No. 35 is a lady's gold pen, with ivory holder. Price, $2 75. This is indeed a very neat and beautiful pen for ladies' use. We send it, postpaid, by mail, inclosed in a handsome velvet-lined morocco box, for 6 subscribers.

No. 38—The Celebrated St. Germain or German Student's Lamp.—as it is sometimes called. This lamp is made and furnished to us by C. F. A. HENRICHS. It scarcely needs eulogium, being the standard thing in our leading colleges, both among students and professors. They reject gas, even where it is most plentiful and convenient, and save their much-worked eyes by the motionless pure white light for which this lamp is so remarkable. No other artificial illumination approaches so nearly to the still colorless sunlight. The secret is in the scientific adaptation of burner and chimney to produce that perfection of draught by which absolute combustion is attained without vibration. The porcelain shade softens the light most agreeably. The lamp slides on a vertical standard, and is adjusted by a set-screw at any desirable elevation to accommodate the work or the eyes. The reservoir is elevated above and at a short distance from the burner, (communicating by a pipe,) so that the oil is always cool and out of reach of flame. The reservoir can be taken out of its telescopic socket, and carried away to another room and filled and returned, without putting out the light. The lamp will be a treasure worth no little trouble to obtain to any one who needs strong light, or who values eye-sight, economy, neatness, pure air, and freedom from trouble and annoyance with lamps; as in all these points it is without a peer. The price of these lamps is $8, with 25 cents for packing. The mineral sperm oil can be had from most respectable dealers, or ordered in packages of any size (1 gallon upward) from Messrs. HENRY RUSSELL & Co., 38 Park Place, New-York.

No. 39—Family Scales.—These scales combining the advantages of counter and platform scales, are peculiarly adapted to household purposes. They weigh from ¼ ounce to 240 lbs. They have a scoop or pan for weighing flour, sugar, and other house stores, and a platform for heavier articles, and are just such an apparatus as is needed for in-door or out-door use, occupying less than two feet square. These scales are manufactured by the well-known FAIRBANKS & Co., No. 252 Broadway New York, whose weighing apparatus has long ranked as the standard in all parts of the country. Send to them for circulars, if desired.

Nos. 45-53—Bailey's Patent Planes.—To those who have used these planes and know their value, is but small praise to say that they are superior to any others made. They are so far ahead of any others that there can be no comparison between them. They are self-adjusting in every respect. Both the wood and iron planes are entirely independent in themselves, requiring neither hammer, screw-driver, nor wrench to replace or adjust the cutter, which is held firmly in place and can be instantly released by use of the cam and its thumb-piece. The cutter is adjusted by simply turning a thumb-screw under the bed-piece upon which the plane-iron rests. By this the cutter can be adjusted to any thickness of shaving. The Stanley Rule and Level Co., 55 Chambers Street, New York, warrant these planes to be of the best stock and finish. The various numbers and sizes of these planes which we offer give carpenters, mechanics, and others desiring them, an opportunity to get a complete set of either the wood or iron planes as premiums. The smooth planes, of which we offer two sizes, are 5½ inches long, 1¼ inch cutter; and 8 inches long, 1¾ inch cutter.

Jack plane.. .....14 in. long, 2 in. cutter.)
Fore " .....18 " " 2¾ " " } Iron.
Jointer " .....22 " " 2¾ " "

In the wood planes the lengths and widths of cutter embrace all sizes made. Forty-four subscribers at $..50 each, or 141 subscribers at $1 each, will get a complete set of the wood-planes. Sixty-nine subscribers at $1.50 will get a complete set of the iron planes, which will last a life-time. If larger sizes than those given are wanted, a few extra subscriptions will be required, according to the difference in the price.

Nos. 54-76—Machinists' Tools.—This series of premiums, consisting of machinists' tools, etc., has been selected and put up at the suggestion of several practical men with whom we have consulted in regard to the subject. These gentlemen, who have a practical knowledge of the tools, and of the requirements of all who have any thing to do with the working of metals, give their unqualified approval of the tools we have selected. This list of premiums has been made so extensive that every man who has any industrial operrtions to carry on will find some tool or tools absolutely necessary to him. By sending us clubs of subscribers to THE MANUFACTURER AND BUILDER these tools may be obtained by the smallest possible amount of labor. Of the qualities of these tools, in point of finish, we know them to be the best in the market—the best, without challenge. When a man has a set of any of them in his tool-chest, he knows he has the means of producing work equal to any that can be done. We obtain these tools from the general agents, Messrs. POST & GODDARD, 109 Liberty Street, New York.

No. 77—Foot-Lathe No. 1.—Of these useful articles we offer two kinds. No. 1 is perfectly adapted for most kinds of turning in wood or metals; also drilling, boring, polishing, sawing, etc. It seems to be the size desired by most people. This is proved by the great numbers of them sold. This lathe takes a piece between centres 19 inches long and 6¼ inches wide in diameter. It weighs 200 pounds. It is fitted with two pointed centres, one spur-centre, face-plate turned and polished, twe rests, one 9 and the other three inches long; also centre key and wrench combined, which fits the screw heads in different parts of the lathe. The balance-wheel weighs 45 pounds, is turned true, and is polished. It has two sizes for change of speed. This size of lathe has a great many extra parts made for it, so that whenever they are wanted they can be obtained. This is a very valuable point, as in buying other machines of the kinds only such things as happen to fit can be used, and they are not always to be found when wanted. The Rev. JOHN TODD, D.D., speaking of lathes, says in regard to these, "For price, for finish, for beauty and workmansip, I have never seen any American lathe so desirable. Of the No. 1 he says: "Nobody can own the lathe without daily gratitude." We procure these lathes through Mr. LUCIUS W. POND, 98 Liberty street, the well-known manufacturer of machinists' tools. Few people can obtain one of these lathes more easily than by obtaining 65 subscribers for THE MANUFACTURER AND BUILDER, for which we ship this premium, without any additional charge for boxing. The regular price is $50. We include leather belt 8 feet long, which costs 90 cents in the price given in the table.

No. 78—Foot Lathe, No. 2.—Our subscribers are frequently asking for second-hand lathes, saying at the same time that such a one would answer their purpose, and probably come cheaper. There are many others who do not care for so complete a lathe as No. 1. The No. 2, we think, will answer this demand. It is made of cheaper materials, but in the same style as lathe No. 1. The frame is of wood, with curved legs, which give it a neat and attractive appearance. It is painted and ornamented in the best style. The bed is made with iron slides three feet long. Will take a piece between centres 21 inchhes long and 6¼ inches in diameter. It has an iron pulley like No. 1. The spindle runs accurately. The face-plate takes off, and the centres are fitted to tapering sockets. Tailstock spindle traverses with a left-hand screw. Everything is well fitted and finished. The balance-whee is the same pattern as for lathe No. 1, and is turned true. The lathe, with face-plate, long and short T rests, two pointed centres, spur-centre, and wrench, packed for transportation, costs $30. For this we also include the leather belt, 8 feet long, which is used on the driving wheel. We box this lathe and deliver it on the cars for a club of 47 subscribers at $1 50 each, or 124 at $1. The twist-drills and chucks—premiums 65, 66, and 69 to 73—especially the smaller sizes, are just the things for these lathes. The chucks, No. Ox, 2 and 3, cost $2 extra for fitting in the lathe. Those desiring further information in regard to the premium may send to WESTERN & Co., 37 Park Row, New York, for an illustrated pamphlet.

No. 79—The Dollar Steam-Engine.—This is a real working steam-engine and boiler, which runs half an hour, or until its fill of water is evaporated, by means of a small spirit-lamp, which forms a part of it. It can not explode or get out of order. A most instructive as well as entertaining toy. Sent, prepaid, for 5 subscribers at $1 50. It is manufactured by COLBY BROTHERS & Co.

Nos. 80, 81, 82, 83—Compact and Powerful Portable Steam-Engine and Boiler.—BAXTER'S patent is acknowledged by many experienced engineers to be the most perfect combination, of standard principles exclusively, and thorough workmanship, ever made in a portable engine. At the same time such is its compactness and the scale and system on which it is manufactured, (by the Colt Armory, at Hartford, Ct.,) that it is afforded at the lowest price ever known for the same (actual) power. It is made by machine tools constructed expressly for it, of standard interchangeable parts throughout, like the celebrated American watches. Consequently we are able to make it one of our most attractive and valuable premiums. Besides, it is warranted to consume less fuel per horse-power than any other engine. This is in consequence, partly, of the improved arrangement of the boiler and the cylinder being entirely let into th eam-space, to save room and heat. The one-horse and boiler (which, like the others, will run above, not below rated power) stands but five feet high, over all, by two feet in diameter. This is premium No. 80, costs $300, and can be had for 320 subscribers at $1 50 each, or 1125 at $1 each. The five-horse engine and boiler stands 6¼ feet high by 3 feet in diameter, costs $800, and can be had for 858 subscribers at $1 50 each. The ten-horse engine costs $1200, and will run a good sized manufactory. There is now no reason why any body should be without a first-class steam-engine, especially as these engines are so simple, snug, safe, and economical of fuel that they can be run in any apartment by the fire required to warm it, and by and person of common intelligence, and will be received from the factory in perfect readiness for use. For running small lathes, drills, etc., circular and scroll saws, printing-presses, corn-huskers, cider-mills, fanning-mills, feed-mills, cotton-gins and hullers, cheese-presses, churns, pumps, washing-machines, sewing-machines, rotary blowers for forges and other purposes, etc., the smallest of these engines will be found thoroughly effective, and as little incnmbrance and trouble as a kitchen stove. For business, however, we recommend to try for one of ample rather than of bare sufficiency.

Nos. 84, 85, and 86—Steam-Pumps.—These steam-pumps are of the best class and quality, economical in the use of steam, and capable of being applied in various ways. No. 84 is one of Hardick's manufacture, which took the first prize at the Fair of the American Institute a year ago. Nos. 85 and 86 are two sizes of the celebrated Cameron pump. Nos. 1 and 2. The first has a steam cylinder 4½ by 7 inches, and its capacity of ordinary speed is 15 gallons per minute, and costs $150. Size No. 2 has a steam cylinder 6 inches in diameter, with 8-inch stroke. It costs $200, and is capable at ordinary speed of delivering 30 gallons of water per minute. These pumps are remarkable for their compactness, simplicity, and durability. The valves are large and not liable to become choked up. By simply removing the bonnet, access can be had to them for inspection or repair,

Nos. 105 to 108—To Procure a Patent without Money.—We have met with many having valuable inventions, which inventors are anxious to get patented, but are unable to afford the expense, and consequently fail to secure the profits which a patent might produce. To such as are in this position, we make the following liberal offer: No. 108—We will prepare an application for a patent, attend to its passage through the Patent Office, and pay all government fees and incidental expenses attending the same, for any inventor presenting a patentable invention, who will get up a club of seventy-five subscribers for THE MANUFACTURER AND BUILDER for one year at $1,50 each, or 250 at $1 each, and send us the money by post-office order. If this application should be rejected, they may send us an additional list of thirty subscribers at $1.50 each, and the subscription money for the same, on receipt of which we will prepare and prosecute a second application, paying all government fees and incidental expenses. No. 107—For a list of fifty subscribers at $1.50 each, or 150 at $1 each, with the cash accompanying it, we will prepare an application, attend to its passage through the office, and pay the government fee ($15), the applicant paying the second government fee of $20. No. 106—For a list of thirty-five subscribers at $1.50, sent in the same way, we will prepare and prosecute an application, the applicant paying the government fee. No. 105—for twenty-eight subscribers at $1.50 each, or eighty at $1 each, we will prepare and file a caveat, furnish the necessary drawings, (which we also furnish in all the above cases), and pay all government fees. All cases placed in our hands under these arrangements will receive our best attention, equally with those for which our fees have been paid in cash, and will be appealed to the Board of Examiners-in-Chief if necessary, the applicant paying the government fee of $10 on such appeal. If the inventor has no model to accompany his application, he may procure additional subscribers, the premium on which (see cash rates) will enable him to pay for the model. A club of 100 names has been obtained in a single establishment where from 150 to 200 hands are employed. A village of 500 inhabitants will take this number readily.

No. 129—Sewing Machines.—Your choice! A $65 machine for 65 subscribers, at $1.50 each.—It makes no difference to us which machine we send, or whether it is selected at first or at the last moment. No charge for boxing the machines; they go safely as freight. For circulars, giving full particulars in regard to style of machines, fixtures, etc., as well as instructions, send to **Grover & Baker Manufacturing Co.**, 495 Broadway, New York; **Florence Sewing Machine Co.**, 505 Broadway, New York; **Wilcox & Gibbs Sewing Machine Co.**, 658 Broadway, New York; **Singer Sewing Machine Co.**, 458 Broadway, New York.

Nos. 137, 138—Volumes of the Manufacturer and Builder.—The unbound volumes of THE MANUFACTURER AND BUILDER consist of a set of number for a year, each separate in its own paper cover. These volumes amount to a valuable Library on all matters pertaining to the Industrial Arts, and contain more varied information on manufacturing, building, and mechanical subjects than can be obtained in books costing three times as much. The price of the volumes unbound is $1.50 each, at the office, or $1.75 if sent by mail, as they must be post-paid. They are profusely illustrated, the engravings used in them having alone cost thousands of dollars. For ordinary use, the sets of numbers unbound will answer quite well.

Nos. 139, 140—Bound Volumes of the Manufacturer and Builder.—*New* subscribers almost invariably desire to secure the back numbers of THE MANUFACTURER AND BUILDER from its commencement. Some desire them bound in our uniform style, while others prefer to get the loose numbers and have them bound to suit their own tastes. *Our* binding is very neat, and being done in large quantities at one time, is furnished at a *very cheap* rate. It is moreover very handsome, being of cloth, with gilt title and back, sides embossed and ornamented with a neat architectural device stamped in gold. The price of the volumes is $2.50 each, sent post-paid.

No. 141—Covers for Binding the Manufacturer and Builder.—These are described in premium 139, 140. Now ready for 1869 and 1870. Be careful to state *which year* you require. Any country binder will insert the year's numbers in one of these covers at a moderate cost. Price, 50 cents; sent, *post-paid*, on receipt of three subscribers at $1,50 for each cover.

Nos. 142 to 154—Good Libraries.—In these premiums we offer a choice of books for manufacturers, mechanics, artisans, builders and others. The person entitled to any one of the premiums 142 to 153, may select any books desired from the list published in our Special Premium Sheet, to the amount of the premiums, and the books will be forwarded, post or express paid. $25 or $50 worth of books pertaining to the industrial arts will give the boys new ideas, set them to thinking and observing, and thus enable them to make their heads help their hands. Any good book will, in the end, be of far more value to a youth than to have an extra hundred dollars on coming to manhood. ☞ Let the mechanics of a neighborhood unite their efforts, and through these premiums get an industrial library for general use.

No. 154—General Book Premium.—Any one sending twenty-five or more names may select books from our list to the amount of ten cents for each subscriber sent at $1; or thirty cents for each name sent at $1.20; or sixty cents for each name at $1.50. *This offer is only for clubs of twenty-five or more. The books will be sent by mail or express, prepaid through by us.*

SPECIMEN COPIES, CIRCULARS, SHOW BILLS, etc.,

will be furnished free of charge in sufficient quantities to meet the reasonable requirements of agents. We would respectfully request that they do not waste them, but distribute them judiciously. If some unexpected event should prevent them from continuing i the business, they will do the square thing by us b giving their outfit to some friend, who will continue th business where they have left off; and who will no doubt be grateful for the opportunity of receiving profitable employment.

Postage.

Every subscriber pays his own postage at the office where he receives the paper. This is only twenty-four cents per year, or six cents per quarter, payable in advance.

Don't Give up Your Town

until everybody has been supplied with a circular and has had a chance to subscribe; and be sure that you leave your address, so that they may know where to find you in case they should make up their minds to take the magazine after you have left them. Make all drafts, money-orders, and registered letters payable to the order of Western & Company, publishers, and address all communications

WESTERN & COMPANY, Publishers,
NO. 37 PARK ROW, NEW YORK.

TABLE OF CASH PREMIUMS For 1871.

EVERY MAN HIS OWN PAY-MASTER. STEADY EMPLOYMENT AND GOOD PAY.	PREMIUMS. At $1 50 each.	PRE At $1 00 each
For every club of 4 subscribers.....	$1 00	
" " " 10 "	3 00	
" " " 15 "	6 00	
" " " 20 "	10 00	
" " " 30 "	16 50	$15 50
" " " 40 "	24 00	4 00
" " " 50 "	32 50	7 50
" " " 75 "	48 75	11 25
" " " 100 "	65 00	15 00
" " " 200 "	140 00	40 0
" " " 500 "	350 00	100 00
" " " 1000 "	700 00	200 00

INTERMEDIATE CLUBS.

It often happens that clubs are made up of numbers that are not found in the above table. Names may be added to clubs at the following rates:

In clubs of 4 and less than 10..$1 25 for each name.
" " 10 " " 15.. 1 20 " "
" " 15 " " 20.. 1 10 " "
" " 20 " " 30.. 1 00 " "
" " 30 " " 40.. 95 " "
" " 40 " " 50.. 90 " "
" " 50 " " 200.. 85 " "
" " 200 " " 500.. 80 " "
" " 500 " " 1000.. 80 " "
" " 1000 and over..... 80 " "

The Profits of the Cash Business, it will be seen by the above tables, are large and accrue rapidly. Every experienced canvasser knows that it is far easier to obtain 4 subscribers to a paper like THE MANUFACTURER AND BUILDER at $1 50 each than to get 1 subscriber to a high-priced magazine, costing $6. This is more strikingly evident when the fact is taken into consideration that our paper, costing only $1 50, is ACTUALLY SUPERIOR IN EVERY RESPECT TO ANY THING OF THE KIND IN THE COUNTRY COSTING TWICE THAT SUM.

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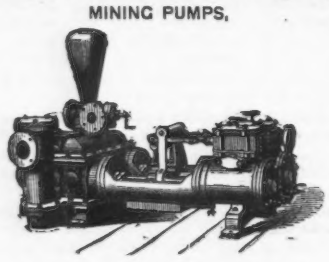

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U. S. PATENT OFFICE,
WASHINGTON, D. C., May 26, 1871.

On the petition of THOMAS J. CHUBB of New York N. Y., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Separating Ore.

It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extention. M. D. LEGGETT, Commissioner.

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U. S. PATENT OFFICE,
WASHINGTON, D. C., May, 25, 1871.

On the petition of CHARLES H. SAYRE of Utica, New York, praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Cultivators.

It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

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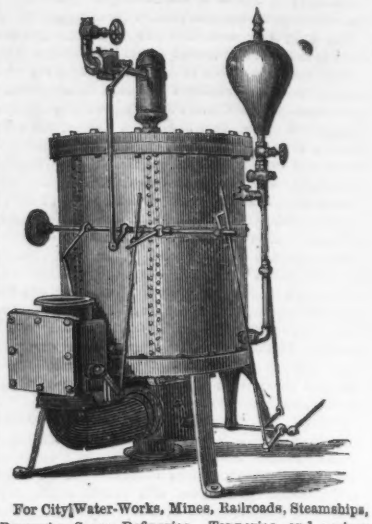

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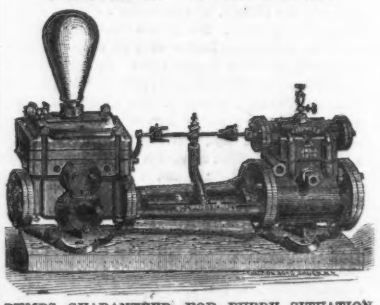

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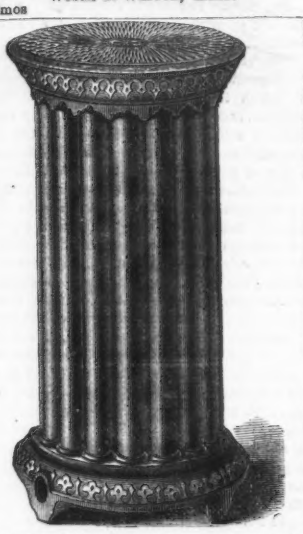

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U. S. PATENT OFFICE,
WASHINGTON, D. C., May 11, 1871.

On the petition of JOHN TOULMIN of Worcester, Mass., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Vibrating Shears.

It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

U. S. PATENT OFFICE,
WASHINGTON, D. C., May 11, 1871.

On the petition of JOSEPH W. BUDD of Midland City, Michigan, Administrator of ISRAEL DODENHOFF, deceased, praying for the extension of a patent granted to the said ISRAEL DODENHOFF, on the 18th day of August, 1857, for an improvement in Baking Apparatus for Harvesters.

It is ordered that the testimony in the case be closed on the 18th day of July next, that the time for filing arguments and the Examiner's report be limited to the 28th day of July next, and that said petition be heard on the 2d day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.